The
DENTAL JOURNAL
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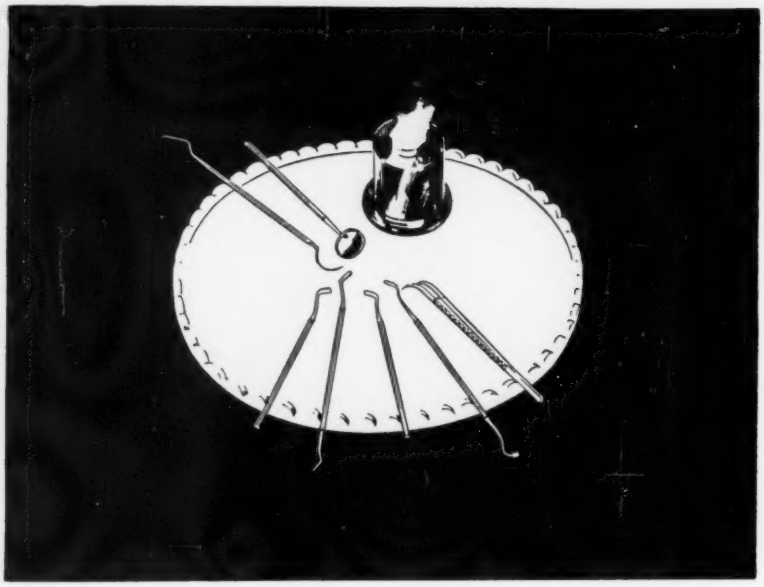

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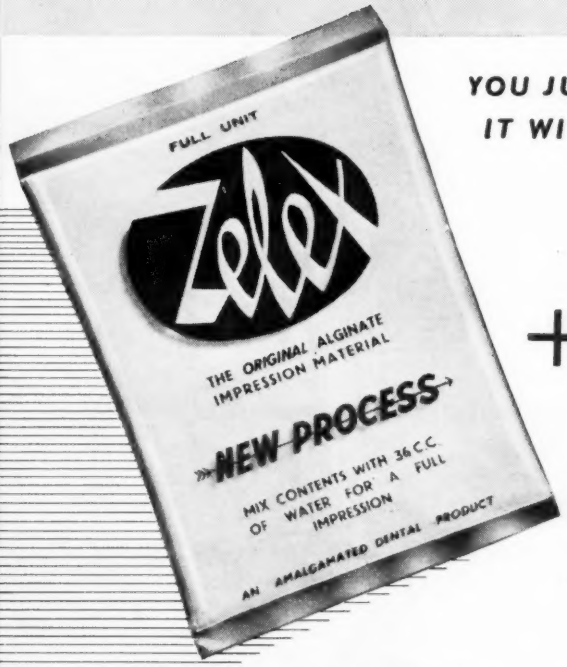
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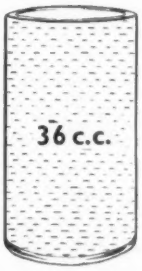

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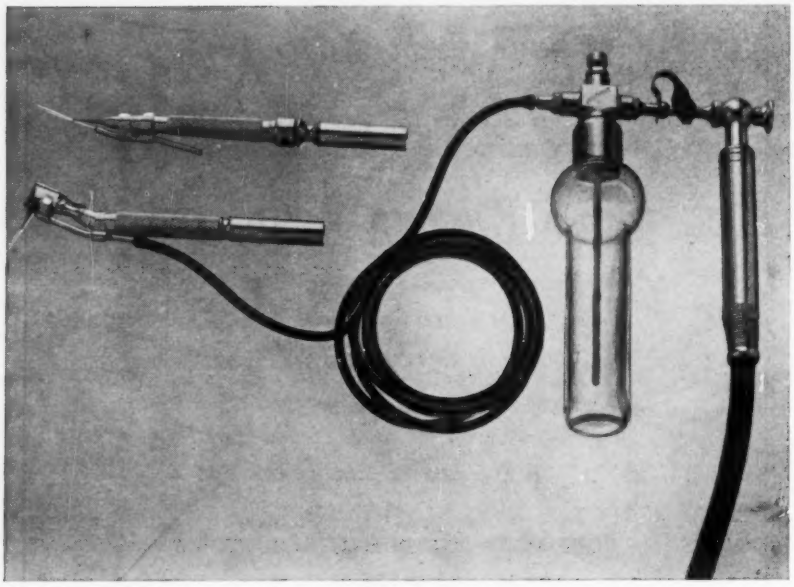

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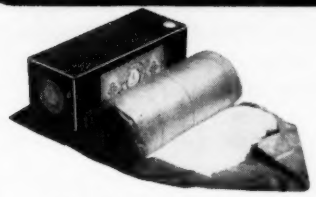

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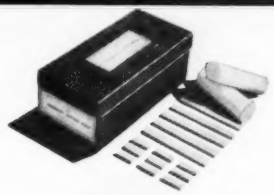

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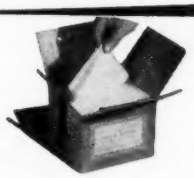

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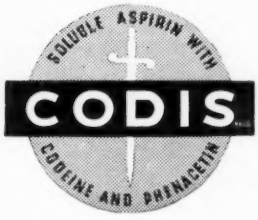

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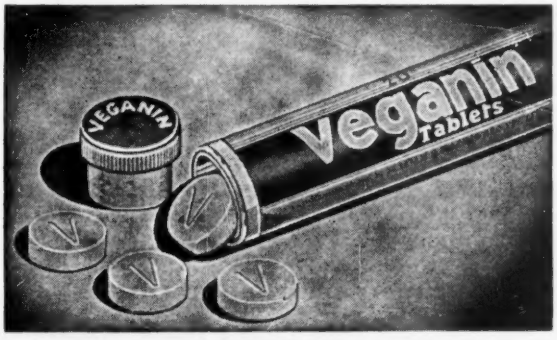

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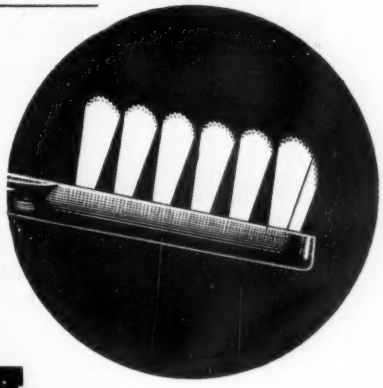

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Practical Considerations in the Retention of Full Dentures*

Edwin H. Johnson, D.D.Sc. (Melb.)

In contrast to methods of tooth restoration where standardised techniques are found to produce substantial uniformity in results, the wide variety of conditions presented by the edentulous patient makes the issue much less predictable. The position is further complicated by differences of temperament and in the ability of patients to adjust themselves to the wearing of dentures. It is not surprising that these problems have resulted in a vast accumulation of literature and a perennial crop of "new" techniques or that on almost every phase of denture construction there are held widely divergent differences of opinion.

The dentist is led to try one technique after another and gradually incorporates into his own method those features which appear to be sound, discarding those which he considers unduly complicated or merely fads. He is aware that many short-cut methods are a delusion, as post insertion adjustments may more than nullify any time that may have been saved at the chairside, apart from the adverse psychological effect these have on the patient. On the other hand, he must be convinced that the results to be obtained by more elaborate methods are commensurate with the additional time consumed.

Emerging from clinical experience and investigation, certain facts have come to be accepted as basic principles, and it is the purpose of this paper, in discussing retention, to describe methods which the writer believes to be in accordance with those principles and by which satisfactory dentures may be constructed without undue complication or the expenditure of excessive time. The term "satisfactory" denture is a relative one as an examination of a number of denture wearers w ll confirm, and will probably be interpreted differently by various patients and by dentists themselves. Amongst those who state that theirs are satisfactory, it will be found that some dentures will have been well designed, but, with the passing of time, have ceased to fit and efficient occlusion has been lost. There will be others which exhibit faults in the original design and yet many of these patients through long usage manage to tolerate them and are unaware of the greater comfort and efficiency they could enjoy with new and well constructed dentures. Most dentists will agree that, given two patients, one with poor ridges but of an optimistic disposition and the other with favourable mouth conditions but of a neurotic tendency, it is more than likely that the former will be the more successful in managing his dentures. The importance of cultivating the proper attitude of mind in the patient is one that cannot be too strongly emphasised and is a much neglected phase of prosthetics. Before commencing a case the dentist should discuss with the patient any difficulties presenting and point out the probable limitations he will experience. A frank discussion at this stage will avoid awkward explanations afterwards, and the patient is more likely, with encouragement from the dentist to use his best efforts towards coping with his disabilities.

Retention and Stability.

There has been, and perhaps still is, some confusion of thought as to what is meant by these two terms. Tuckfield[1] has stated that

> Retention, as related to artificial dentures, is the resistance offered to a force directed at right angles to the seating surface which tends to lift the denture from the supporting surface of the tissues. Stability refers to the maintenance of equilibrium and to the resistance to displacement when masticatory forces act, in general, towards the seating surface.

Thus, whilst retention is largely dependent on the accurate fitting of the denture base to the tissues, stability is controlled by the placement of the teeth in relation to the ridges, the harmonious functioning of cusps and sulci, the distance of the arches from the ridges and the firmness of the foundations. Those factors are therefore somewhat related, inasmuch that a denture with good retention will resist unstabilising forces better than one in which the retention is poor. Obviously, retention and

*Lecture delivered at the Second Country Convention of the New South Wales Branch, Australian Dental Association, held at Orange, September, 1954.

stability will vary from case to case and often some compromise must be made to provide better aesthetics. Just how far one may go in this direction is often difficult to decide, but no concessions to the patient's demands should go beyond the point where function is likely to be jeopardised.

Impressions.

As the first step in denture construction, the making of the impression is an important procedure as, no matter how carefully the succeeding steps are carried out, the denture will be doomed to failure if the impression is not a good one. There are probably many techniques which will produce satisfactorily fitting dentures and sometimes spectacular retention may be achieved, but the important question is whether the retention will be lasting or transient. Ridge preservation is all important and retention is shortlived if traumatic occlusion or other factors are at work destroying the denture foundations.

The difficulties of making an accurate impression of the edentulous jaw are due to the fact that the area to be covered varies greatly in its consistency and is bounded by muscle attachments which must be accommodated to allow function without dislodgment of the denture.

Factors Governing Retention.

1. *Adhesion by contact.* Cox[2] pointed out that this is the most powerful agent in retention and is achieved by the intimate contact of the tissues with the denture surface with a thin interposed film of saliva. More recently Page[3], claiming this as a new conception, goes so far as to say that "interfacial surface tension" is the only force necessary to support the denture and that peripheral seal and post dam are actually inimical to retention. He claims that those who use pressure during the taking of the impression (functional impressions) are not compressing soft tissue but are really displacing it, and that, on release, the soft tissues tend to return to their original position and unseat the denture.

Many workers have long been aware of this fact and it is the avoidance of soft tissue displacement that is the motive underlying the traditional full plaster impression, although the adequacy of this type of impression in other directions is open to question. The assertion by Page that soft tissue may be entirely confined by the denture and, being mostly liquid, acts as a solid body in conformity with Pascal's Law, is an attractive theory but is not practicable in denture construction. If the forces applied to the denture base were always at right angles to the attachment of the soft tissues there might be validity in this argument, but the many lateral components of force present during mastication cause both soft tissue and denture to be displaced bodily.

It is not proposed here to examine Page's other conclusions in detail. They have been fully dealt with and trenchantly criticised in the recent literature[4, 5] and his condemnation of peripheral seal, post dam denture flanges has been shown to be completely out of accord with established clinical experience. A comprehensive and impartial analysis of the "mucostatic principle" has recently been published by Bohannan[6] with whom the writer completely agrees when he states,

> few will challenge the answer that the most accurate reproduction of the ridges and bearing area is the aim, regardless of the impression technique . . . In theory the mucostatic impression does just that.

The controversy has certainly been the means of stimulating interest in an examination of the principles involved in impression making and the writer freely admits that it has caused him to revise some aspects of his own technique, particularly the necessity of taking impressions with the least deformation of the soft tissues. Only by so doing will the full retentive effect of interfacial surface tension be realised.

But interfacial surface tension is only potent in resisting forces acting in a direction at right angles to the surfaces, in the same way that two pieces of wet glass placed together resist separation by pulling outwards, but are easily slid one across the other. De Van[7] points out that if it were not for adhesion (the sticking together of unlike molecules) for example, water to glass, and cohesion (the sticking together of like molecules) the phenomenon of surface tension would not exist. Ostlund studied retention and found that the surface tension of the film between the denture and the model affected retention, retention being greatest with greater surface tension; also that the thinner the film, the greater the retention. In the mouth the favourable areas are the horizontal surfaces of the ridges and the palate, whilst the sides of the ridges offer little resistance against a vertical pull. As a corollary, the larger the jaw and the greater the area covered by the denture, the greater will be the retention.

2. *Atmospheric pressure.* Attempts to utilise atmospheric pressure by means of air chambers in the palate have long been found

to be of little value, but the prevention of ingress of air under the denture margin by a peripheral seal and post dam has been shown by clinical experience to greatly assist retention. Snyder[8] and Stanitz[9] have demonstrated that atmospheric pressure is a major retentive force, and De Van states that

> in function atmospheric pressure is superior to interfacial surface tension as a retentive force, for forces horizontal as well as parallel to the mean mucosal plane are resisted.

Ostlund also found that small perforations along the ridge area did not affect retention but that any perforation in the palate area did so markedly. Since the perforations were small it may be assumed that loss of retention was due to the ingress of air reducing the effectiveness of atmospheric pressure rather than to a reduction of interfacial surface tension. Many immediate dentures exhibit considerable movement when a lateral force is applied but resist downward pulling. Intimate contact of tissue and denture has been lost by resorption, but the peripheral seal at the margins support the denture. Skinner and Chung[10] confirmed Ostlund's work and extended it to investigate the effects of post dam, peripheral seal and relief areas. They found that the use of post dam and peripheral seal, either singly or together, increased retention. Relief areas, regardless of other factors, decreased retention. They also found that the relief in the periphery for buccal frena reduced retention.

3. *Muscle attachments.* Relief of the periphery of the denture to accommodate labial, buccal and lingual frena must be given although there is some loss of seal by so doing. Muscle trimming is a necessity, but it is possible that many times this is carried out to excess. It should provide freedom for normal function but not to such a degree as occurs in yawning or extreme protrusion of the tongue. Whilst the muscle attachments may act as dislodging factors if the denture is over-extended, they can actually be utilised in certain circumstances as a means of seating and control of the denture as described by Fish.[11]

4. *Shape of polished surfaces.* Fish has shown that by suitably shaping the denture so that it is triangular in cross section, the polished surfaces face outwards and upwards. This is of particular importance in the lower, where the buccinator on the outside, and the tongue on the inside can be used as positive retaining agents. The buccal extension, resting as it does on a solid base, further assists in taking the load of mastication. The flanges of the denture also play a part in maintaining aesthetics, and to this end they should be suitably developed in the impression.

5. *Relief areas.* Extensive relief on the palatal surface of the denture does not seem to be indicated in most cases as the area of contact between tissue and denture is reduced and retention is lessened. However, with immediate dentures, a relief over the median raphe will help to prevent rocking of the denture after resorption of the ridges, and this relief may also be desirable in edentulous cases where the median raphe is unduly prominent. Slight relief over the posterior palatine foramina may sometimes be indicated and should always be given over the prominent anterior palatine papilla, but, in general, if these areas have been taken without pressure in the impression, there is no danger of interference with blood supply.

Rest Period.

It is quite common to find areas of local or generalised inflammation in the palate where ill-fitting dentures have been worn. The practice of taking impressions whilst these conditions are present must be open to question as inflammation is always accompanied by swelling. As these areas will disappear under the better conditions of the new denture some loss of fit may be expected. In these cases the patient should be instructed to leave the denture out as much as possible, and the impression should not be made till the tissues have become normal. A rest period is, in fact, beneficial to all patients as, even when inflammation is absent it is probable that an ill-fitting denture may deform temporarily the underlying tissues. That this is so is borne out by the fact that many patients find their dentures to be a poor fit in the morning after having left them out overnight. Even placing the denture in warm water before inserting and thus excluding the possibility of the discrepancy being due to thermal contraction of the denture has not been shown to result in any improvement.

For this reason the writer has made it a practice for a number of years to issue instructions that, for a week or more prior to impression taking, the dentures are not to be worn any more than is absolutely necessary. The morning that the impression is to be taken, the dentures are inserted only whilst breakfasting, are then removed, and the patient comes to the surgery in an edentulous state. There appears to be no doubt that improved results follow this procedure. Craddock[12], confirming these observations, has taken impressions of the same mouth on the immediate removal of the dentures and

after a rest period. He claims that by measuring across various landmarks he has been able to demonstrate discrepancies between the two, and insists that the dentures should not be worn at all for a fortnight. Most people are not prepared to accept these restrictions on their social activity, and it seems that the overnight rest period is adequate.

The Maxillary Impression.

The simplest form of individual tray consists of a primary compound impression suitably modified. This does not mean merely a "snap" impression, but one taken with tempered compound as described by Tuckfield[13], held in position with the lightest of pressure, and of a thickness which will ensure adequate strength for subsequent operations. Some experience is necessary for the successful manipulation of compound, the most common failures being due to too heavy and sustained pressure causing the materials to continue to flow after partially hardening. If the temperature of the compound has not been properly regulated, the margins of the tray may penetrate through and impinge on the tissues.

After determining the posterior margin, the metal stock tray is discarded and excess compound removed. Muscle trimming of the flanges is then carried out and should be accentuated at this stage so that there is no fear of over extension. A matter that is often overlooked in this operation is the muscle tone of the patient. Elderly patients, and those who have worn dentures for a long time, have lost much of the power of contraction of the facial muscles and in these, the flanges may be permitted to extend rather higher than in those with greater tonus. Some operators may prefer to muscle trim the periphery in low fusing compounds, but this is optional and in either case the tray should be immersed in ice water from time to time to prevent distortion of the parts not being muscle trimmed.

The whole palatal portion of the primary impression is then relieved, including the post dam area, to a depth of about 2 mm. On the periphery, the labial and buccal frena are accentuated, with a slight relief over the zygomatic process and any undercuts in the tuberosity regions removed. The upper one third of the inner surface of the peripheral border is also relieved so that, while the final wash material is carried up into the sulcus, the movable soft tissues in the region of their attachment will not be displaced. Finally, a pattern of five holes (drilled with a No. 8 rose bur) is placed in the palate, one in the anterior portion and two on either side along the alveolo-palatal junction. A further refinement may be carried out at this stage by placing a small amount of Zinc Oxide paste over the primary stress bearing areas. After insertion and removal excess paste is trimmed away and a more accurately adapted seating base for the tray is probably secured (Fig. 1.). Two smaller holes are drilled on each side in the region of the second molar, and through these are passed two pieces of floss silk which hang down into the mouth and are used for dislodging the impression.[14] In cases where portions of the ridge are flabby, considerable relief is made and additional holes drilled in the tray. In those (fortunately rare) cases where the complete alveolar ridge is movable, the procedure is somewhat reversed, the ridge areas being completely relieved and the rugae and median raphe of the palate become the "stops", the very minimum pressure being used in placing the final impression.

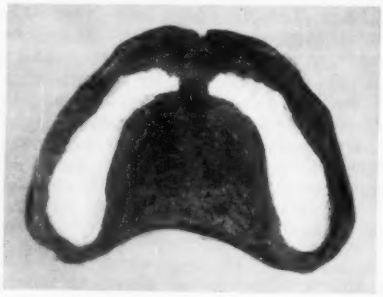

Fig. 1.—Primary impression converted to individual tray. A corrective wash has been taken over primary stress bearing areas; the remainder has been relieved and holes will be drilled over palatal surface.

Whatever impression material is used must flow easily, so that very little pressure is needed to seat the impression. Special types of plaster and alginates are preferred to zinc oxide pastes as the latter are variable, often being too stiff and have the disadvantage of not being miscible with the residual saliva on the palate or the secretion of small glands, which form globules during the setting of the impression. The tray should not be overfilled, and is carried to the mouth using the forefinger and thumb of the right hand, other fingers of both hands distending lips and cheeks. It is gently seated until the material flows above the periphery and through the holes in the palate. The lips and cheeks are allowed to fall back into position, patting the lips lightly and very gently manipulating the cheeks. Only very slight pressure is needed

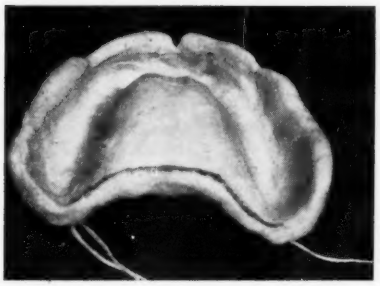

Fig. 2.—Completed upper impression in plaster.

to seat these impressions and even this may be removed as soon as the material has set sufficiently to support its own weight. After complete setting has taken place, the cheeks are distended and the impression dislodged by pulling on the floss silk loops, assisted, if necessary, by the injection of water around the periphery. The palatal termination of the denture, which may have already been marked on the palate with indelible pencil, will be transferred or it may be marked after the impression has been taken and re-inserted. Palatal reliefs are marked similarly and either relieved on the impression or transferred to the cast for relief by soft metal. (Fig. 2).

The benefits to be gained by post dam have already been referred to and this is carried out on the cast after flasking. It takes a few days after the insertion of the denture for the well-known line to appear on the palate, and should post damming be done on the impression by the addition of wax, or on the cast at the time of making the trial bases, it is possible that there may be interference with the proper seating of the denture during the important step of registering centric relation. However, the cast should be marked as to depth and width of the proposed trough by reference to the patient as the "compressibility" varies considerably from the Hamular notch to the mid-line.

The Mandibular Impression.

Although the same principles are observed in the making of the lower impression the method varies somewhat from that used for the upper. An over-extended compound impression is taken in a stock tray and sent to the laboratory to be cast. To allow the technician sufficient time, this is done before the maxillary impression is commenced and it is found that by the time the latter is completed the prepared lower tray is ready for completing the lower impression.

When the cast is returned to the surgery, the operator interrupts his work on the upper impression and outlines on the cast the periphery of the tray. (Fig. 3). This is done by recognising certain anatomical landmarks in conjunction with an inspection of the particular conditions present in the patient's mouth. The outline is commenced at the distal termination of the retro-molar pads, proceeds buccally to clear the anterior margin of the masseter and then swings wide into the buccal pouch, the width being determined by palpation and manipulation of the cheek. This may be at first deceiving as Fish has shown that the buccal extension can be formed overlying the external oblique ridge without interfering with the active part of the buccinator muscle. It is highly desirable to develop the greatest width possible in this region, as, not only is a much greater seating area obtained,

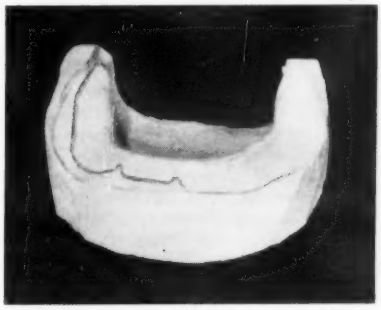

Fig. 3.—Cast of lower jaw on which border outline for tray is made.

but, owing to the shape which can be developed in the polished surface, the muscle itself, overlying the denture is a powerful seating force during function. As the buccal frenum is reached the denture margin must not only be shallower but narrower to accommodate the action of the modiolus. From this point to the mid-line the margin follows the reflection of the mucosa and at the mid-line accommodates the labial frenum.

Lingually, the outline swings backwards into the lateral throat area (if this is permissible) and then forward and below the mylohyoid ridge, if palpation and the functional movements of the floor of the mouth indicate that it is possible. At this juncture it might be mentioned that soreness experienced over the mylohyoid ridge is not due to over-extension in this area but to the sharpness of the ridge itself. Some operators terminate the

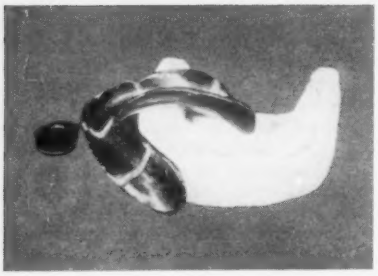

Fig. 4.—Lower tray with wire handle and wax stops.

denture at the ridge, but even if this is done, downward pressure will still cause discomfort. Assuming that there is not undue lateral thrust caused by faulty occlusion, comfort can be obtained by relieving the impression surface over the ridge area. Further forward the outline dips in the bicuspid region, but rises again to clear the lingual gland, the genioglossus muscle and lingual frenum. The lingual border is governed largely by the functional movements of the floor of the mouth which follow the movements of the tongue. However, the musculature is weak under normal functional movements, and no attempt should be made to accommodate extreme lifting or protrusion of the tongue. The tray is made by adapting compound to the area outlined and strengthened by a rigid wire embedded into its upper surface. A short wire handle is fitted. (Fig. 4). Four narrow wax strips are then placed at equal distances on the inner surface, gently heated, and the tray inserted in the mouth. These stops will centre the tray and provide space for the impression material. Undercuts should be removed.

Zinc oxide pastes or alginates may be used as impression materials, plaster being less satisfactory. The mouth should be dried with cotton rolls to remove saliva and the impression seated with the least possible pressure. The patient is instructed to open the mouth moderately and at the same time to elevate the lower lip. The tongue is raised and protruded gently, first to one side of the tray handle and then the other but these movements should be no more than will be used in normal function. Light finger pressure over the first bicuspid area is maintained so that the tray will not be lifted by the tongue until the material has set.

On removal it will be found that the wax stops are the only portions of the tray showing through the impression and it is a simple matter to pare them down with a sharp knife so that they become confluent with the general surface of the impression.

Impressions for Immediate Dentures.

The same principles that apply to the taking of the impression for the edentulous jaw hold good for immediate denture impressions. Practically the technique must be altered on account of the undercuts associated with the standing teeth. Sectional impressions using rigid materials are sometimes used or straight out impressions in elastic materials using stock trays. The latter method is not recommended. The writer believes that the technique to be described, and which he has now used over the last three years, incorporates all the essentials of a good impression, and can be carried out in less time than a sectional impression. A range of specially made trays

Fig. 5.—Special upper trays for immediate denture impressions.

has been accumulated, although it is found that about five or six of each upper and lower trays cover all requirements (Fig. 5). A series of casts of various sizes was selected and oversized acrylic trays were made after blocking out the teeth and fitting a spacer over the palate and ridges. The peripheral border of the tray was kept low enough to avoid any impingement on the border tissues and perforations were made over the palatal and labial surfaces to afford retention to the impression material. Three lugs, one in the front and one in each molar region, enable the impression to be removed. The tray selected should be such as to allow for a normal thickness of compound in the bicuspid-molar region and the labial flange should extend well up into the sulcus and as close to the gum surface as possible without impingement. Unless the tray fits snugly here, the lip

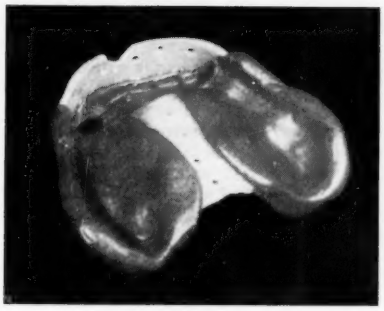

Fig. 6.—Tray with compound muscle trimmed.

and soft tissues under the nose will be forced forward with the result that the finished labial flange of the denture will stand away from the gum surface and unduly distend the lip. In making the primary impression a roll of compound is placed over each section of the ridge, and a much smaller amount in the anterior portion of the tray, sufficient only to give an impression of the incisal edges of the teeth. After seating in the mouth, muscle trimming is carried out as for the edentulous jaw. When completed, all compound is removed from the palatal section, thus leaving the tray supported by the tips of the teeth and the ridge areas, with a properly controlled peripheral border (Fig. 6).

Alginates are preferred to hydrocolloids which gel too quickly in thin sections and do not adhere well to the compound. The posterior margin is marked on the palate, and the tray with impression material seated quite firmly, as the incisal edges of the teeth form a non-yielding stop where they contact the compound. Should an unusually deep vault be encountered a mound of compound may be placed in the palatal portion of the tray and kept just clear of contact with the palate. Functional movements of lips and cheeks may be carried out before the material gels and it is important to pat the upper lip and to pull it well down so as to create a very thin labial margin, as well as to avoid over-extension of the border (Fig. 7).

Little comment is needed on the lower impression as the method is similar. The preparation of the primary impression should conform to the same principles that apply to the full lower impression technique, except that the tray is prepared in the mouth instead of on a cast. As many of these cases have been without posterior teeth for considerable periods and frequently the residual ridge is fragile, thin wax stops are placed across the compound in the molar region in the same way as in the full lower impression, the tray being supported anteriorly by the incisal edges of the teeth.

Relines and Remakes.

Satisfactory impressions are difficult to take in ill-fitting denture bases, although should the original denture base have been properly outlined in accordance with the principles stated earlier, it may quite conveniently be used as a tray, correcting the tissue surface with compound. Re-lining is justifiable in immediate lower dentures to tide the patient over the first few months after the teeth are removed and the self curing acrylics are very useful for this purpose. A very small amount of zinc-oxide paste is introduced in the resorbed area in the incisal region only, and the

Fig. 7.—Completed under immediate denture impression.

denture can be delivered to the patient with no more delay than for a repair. The upper denture may be treated similarly, although the necessity for this is less frequent. When the time arises for re-making, indicated by loss of vertical dimension and centric occlusion as well as loss of fit, it is far more satisfactory to make entirely new impressions, take new registrations and to strip down the dentures rather than to attempt various "face lifting" expedients using the existing denture bases.

Other Factors Affecting Retention.

Too often a poorly fitting denture is ascribed to a poor impression. This may be true but it should be pointed out that the impression is but a means to an end—an accurately fitting denture base—and whilst it is perhaps the chief factor, one must not lose sight of the other common, and often unrecognised dis-

crepancies which may creep in. From the moment the impression leaves the operator's hands each succeeding step may introduce error. Unless the cast is poured immediately the impression material, especially if an alginate, may undergo change. Too thick a separating medium will obliterate fine detail. Careless handling of the cast by the technician when fitting and removing hard base plates, especially over the rugae or undercuts, will affect retention. In the processed case the technician may alter the peripheral margin or posterior border when finishing. Warpage may take place due to heat generated during polishing. The remedies for all these errors suggest themselves and should not occur with competent technicians. The most serious discrepancy at the present time, and one which cannot be entirely obviated, is due to inherent shortcomings of acrylic materials. During processing, internal strains are set up in the denture base and the release of these strains and consequent distortion prevents the denture base from fitting the oral tissues in the same intimate way that the impression did. Some dentists regard the position as such that they claim that the original accuracy of the impression can only be maintained by the use of cast metal bases. Even in so-called favourable cases, where the ridges are full and the vault deep, retention is frequently disappointing, compared with that which may have been obtained using vulcanite. Under present conditions of processing it does not appear that these shortcomings can be overcome although they may be minimised by long time low temperature processing. The practice in my laboratory is to start the processing at the end of the day's work, using a thermostatically controlled water bath at 160 deg. A time switch cuts the current off after nine hours so that deflasking may be undertaken immediately the technician resumes the next morning. The recent work being done by Atkinson[15] seems to indicate that his method of curing acrylic resin under air pressure may prove a substantial contribution towards the elimination of processing distortion.

In conclusion, neither the dentist nor the patient will be happy unless the end result is long lasting. Unless occlusion and articulation are designed so that the denture will be stable under masticatory forces, resorption of the ridges will rapidly ensue and may progress to such an extent that any future prosthesis may fail to provide even reasonable function and comfort. No denture service can be said to be complete unless the patient is given adequate instructions on the necessity for regular inspection and maintenance. These instructions should be printed as oral advice is quickly forgotten. A question that is asked frequently is whether the dentures should be worn at night. The writer believes that a rest period overnight and a thorough cleaning of the dentures is most important in maintaining a healthy mucosa. It should be explained that with the passing of time some change in the denture foundation is inevitable, and that when this occurs the proper functioning of the teeth is impaired. Many denture-wearing patients subsist on a largely carbohydrate diet, and the necessity for a well-balanced and adequate nutrition cannot be too strongly emphasised. The nervous habit of grinding the teeth undoubtedly plays a part in ridge destruction, and should be eliminated. By educating the patient in this way to a proper understanding of his denture problems, greater co-operation and goodwill may be expected.

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A Review of Recent Orthodontic Thought*

Rex E. Fortescue, M.D.S. (Syd.)

An understanding of Orthodontics must be based on a knowledge of the growth and development of the area in which we work, particularly of the jaws. Growth of the maxillae and of the mandible is by two entirely different processes. Weinmann and Sicker[1] and Strang[2] cover this field well. According to them, the maxillae increase by sutural growth. This occurs mainly at the fronto-maxillary suture, the zygomatico-maxillary suture, and the pterygo-palatine suture. Secondly it occurs at the zygomatico-temporal suture and the median-palatine suture. The latter suture gives some early lateral growth to the maxilla. It is noted that the other four sutures are parallel and run downwards and backwards, hence growth at these sutures results in a downward and forward movement of the maxillary complex. Some surface apposition takes place, mainly to accommodate muscle attachments. Although the sphenoid bone is an unpaired bone, the widening of the maxillae due to their backward divergent growth is allowed for by the divergent growth of the pterygoid processes.

The mandible grows by a small amount of growth at the symphysis until the first year when the symphyseal cartilage ossifies; thence all growth takes place in the hyaline cartilage of the condyles. A little appositional growth takes place along the border of the mandible but this is almost negligible. As the mandible grows, much remodelling takes place in the rami by the apposition of bone along the posterior borders and resorption of bone along the anterior borders resulting in a lengthening of the body of the mandible. The growth taking place in the condyles must be sufficient to lengthen the body of the mandible and increase the height of the rami. The increase in the height of the rami should accommodate the downward and forward movement of the maxillae as well as the growth of the alveolar processes and the eruption of teeth in both jaws. The mandible is also displaced downwards and forwards due to the upward and backward growth of the condyles. Widening of the mandible is due to divergence backward of the body and the widening of the skull base. Weinmann and Sicker show that the mandibular angle does not change throughout life, although the gonial angle as normally measured does change.

There is one point in common in the growth of the jaws in that there is no interstitial growth.

Function according to Weinmann and Sicker does affect the surface contour and the trabeculae of bones. A sufficiency or excess of function results in a denser bone with a thick cortical layer and surface apposition to strengthen muscle attachments whilst a lack of function results in a rather spongy bone with thin cortical bone and in many cases atrophy and osteoporosis.

Strang also emphatically states that the base bone of the jaws cannot be increased in size by either orthodontic appliances or function, although function can alter bone as stated above.

Benson[3] states that "inherited disharmony in the relative rates of growth" is more correct than "inherited abnormality." He says that the mandible has assumed its characteristic form as early as the third month, and the symphyseal fibro-cartilage ossifies at one year. The location of the growth increments is important as they result in a downward and forward movement of the jaws, and also in vertical and antero-posterior growth. Condyle head proliferation continues until the age of 20-25 years. The relation of the gum pads at birth is rather controversial. Benson also discusses alveolar process growth and tooth-eruption; of interest is the downward movement of mandibular canines before commencing eruption. Ramus length growth precedes tooth eruption and alveolar bone growth. Very little change occurs in the gonial angle and any change that does occur in old age is purely muscular. This information was obtained by Benson mainly from cephalometric study, and is of much importance to orthodontics.

*A portion of a critical survey of the literature submitted to the Faculty of Dentistry, University of Sydney in partial requirements for the degree of M.D.S.

According to Burson[4] the bicanine dimension does not appreciably increase or decrease during mandibular growth. He says that

> no general rule concerning timing, duration, or amount of increase in mandibular bicanine dimension may safely be applied to a given individual . . . future increases or decreases in this dimension are not easily predictable in attempting to evaluate an orthodontic problem for such an individual in this age range.

He also says that the main spurt of growth appeared to be five to eight years of age.

There is little written on growth and development. However, the information outlined above presents a clear picture of growth and development as understood by orthodontists today.

Miliette[5] says that the masticatory function of teeth only developed during the late mammalian era. Originally teeth were used for incising and defence. The design of the periodontal fibres in man would indicate that most masticating force is taken by pull on certain periodontal fibres and is not carried to the bone as the periodontal membrane acts as a cushion. He also says that bone has been modified and refined in accordance with form and function. If the load on a bone is increased, or its direction changes, then Wolff's Law operates to bring about bone change. The pattern and basic size of bone is inherited. The main point to note is that the periodontal membrane takes the force of mastication by pull on certain fibres and does not act as a cushion between tooth and bone.

The practice of orthodontics must include also a knowledge of the reactions of the tissues on which we work.

According to Lura[6] the adsorption and formation of bone is regulated by

> a soluble, preformed bone substance . . . circulating in the blood in the form of certain calcium-phosphate-citrate-protein fractions of the plasma.

Hereditary factors have an overall influence. Osteoblasts and osteoclasts are not pre-existent but differentiate from osteocytes. An increase in the forces of pressure or tension within the limits of tolerance results in apposition of bone, but an increase beyond the limits of tolerance results in necrosis and resorption. Application of tension to a pressure area is impossible, but an application of pressure to a tension area results in resorption. Alveolar bone exists because the function of the teeth maintain it. Lura's account of bio-mechanical tissue reactions is of interest in that if such is true then there are possibilities of some degree of artificial regulation of bone growth.

Whatever an appliance does is only what the periodontal membrane allows that appliance to do, is the opinion of Moyers and Bauer[7]. They state that a tipping movement is safer and easier to accomplish than bodily movement as, in tipping, the unaffected vessels supply blood through anastomoses but in bodily movement all vessels are affected. Thus in bodily movement necrosis is more extensive and regeneration slower. Therefore for this movement a much lighter force is required. Time is necessary to "get teeth used to the appliance" and to "limber up." Intrusion, extrusion and rotation should be attempted slowly. Continuous forces should be avoided for intrusion as the membrane is completely compressed and a light continuous force is better for extrusion and rotation movements as in both these cases the membrane fibres are stretched thus cutting the blood supply:

> the speed of clinical response is determined by the amount of periodontal membrane, which must be regenerated before the osseous changes occur.

Physiological tooth movement is non-existent in orthodontics. Light round wires should be used before using an edgewise wire as the latter is a heavy wire causing bodily movement and may result in much necrosis and also root resorption if used early in treatment. The twin wire is the best appliance as it causes less trauma and evokes an earlier response to tipping movements than with other appliances but even with this appliance caution should be exercised. The ideal appliance would exert a force of 15-25 gm. over a distance of not more than 2 mm. and be intermittent: such an appliance does not exist. They feel that failure is due in many cases to a lack of knowledge of the periodontal membrane.

Moyers and Bauer have ably drawn attention to the importance of the periodontal membrane in tooth movement; they have also shown how, by using care this membrane can be made to aid our attempts at treatment instead of hindering those attempts.

Jacobson[8] carried out a survey to obtain the opinions of dentists and orthodontists on the matter of root resorption due to orthodontic treatment. He says that practically all teeth with resorbed roots are quite stable and unaffected, most being not excessively mobile. Few such teeth suffer from progressive resorption resulting in exfoliation. It appears that some alveoloclasia sometimes occurs as a result of the proportionately lengthened crowns. This is of more significance than the root resorption. There is much division of opinion as to whether an endocrine factor exists. Orthodontic treatment is usually con-

tinued when root resorption is discovered. There is generally no great clinical significance except in cases of severe periodontoclasia. Tylman uses these teeth as abutments so long as root length is greater than crown height. Brodie considers that the matter is over-estimated.

Ideas on the causes of root resorption appear to be varied. The shape of the roots, endocrine disorders, the type of tooth movement, class of malocclusion, disease and chronic illness and the type of appliance have all been implicated as causes. According to Jacobson, Strang says that

> root resorption occurs most frequently when roots are forced into contact with the cortical plate of the alveolar process.

Jacobson says that excessive tip back bends cause it in lower molar and disto-buccal root of upper first molars. The prognosis is usually most favourable.

Aetiology.

The aetiology of malocclusion is still not clearly understood. Hereditary factors, according to Hotz[9] are the most important causes of malocclusion. These factors may act directly on the teeth and jaws, and also indirectly through the constitution, growth, internal secretions, disposition to diseases and psychic influences. Endocrine disorders have a profound effect on jaw growth, exfoliation of deciduous teeth and eruption of permanent teeth but not on the formation of teeth. Endocrine disorders resulted in hypophyseal and hypothyroid dwarfism and reflected orally in crowding of the teeth, prognathism and underdevelopment of the mandible. Cases of distocclusion exhibit more frequent and severe constitutional anomalies. The relationship is shown between the occurrence of V-shaped palates with endocrine dysfunction. Orthodontic treatment appears to aid recovery from constitutional factors. Nutrition, particularly its effect on caries and function, is a large factor in malocclusion. Ironically, overnourishment appears to be worse than undernourishment. Habits, early loss of deciduous teeth, and loss of permanent teeth are well known factors.

Whitman[10] stresses the importance of habits as a cause of malocclusion. He says that it is most important to discover the existence of any habit, which may be causing malocclusion before the commencement of treatment. If such a habit is not observed and corrected, then the prognosis, particularly in open-bite cases, is poor. The cause of a habit is often some type of emotional upset which must be treated before the habit can be corrected. He emphasizes the value of co-operation with a paediatrician and psychiatrist. The orthodontist must learn what type of parents the child has, his or her general care, daily life, and health. Naturally prevention at the commencement of a habit is better than correction. Whitman sets out preventive and corrective methods including the use of a "reminder lotion" and phenobarbital.

The aetiology of the perverted swallowing habit is discussed by Straub[11]. During correct deglutition the muscles of expression are relaxed but the perverted act results in a strained appearance being presented by these muscles. The perverted habit is caused by improper bottle feeding instead of breast or correct bottle feeding. The habit usually results in open-bites, but may be present in other cases such as a Class II Division 1 type, cases in which there is spacing on contracted maxillae where the habit is masked by another habit, or by the malocclusion resulting from another habit or cause. The perverted swallowing habit must be detected and corrected, otherwise treatment of malocclusion in such cases will surely be of little avail.

The problem of thumb-sucking is the subject of a study by Lawes[12] who says that it is a cause of dental deformity. From this study of cattle behaviour, analogies to humans have been drawn. Lawes' idea is that the act is instinctive substitute satisfaction and fantasy formation. Treatment requires complete parent co-operation, and he attacks the methods of most psychologists and dental methods of correction. He concludes that thumb-sucking is psychological and is a cause or aggravation of dental deformity. About 24 per cent. of children observed were persistent thumb-suckers.

Littlefield[13] says that thumb-sucking may begin even before birth. Further the habit may not be continuous but cease and recommence or it may not begin until the child is a few years old when it may be continued to adulthood. The main result is that the upper anteriors are pulled forward and, if the thumb uses the lower anteriors as a fulcrum they are forced lingually, or the whole mandible may be forced distally. Open-bite may occur if the pressure is up and down. Sucking of the cheeks during thumb-sucking results in contracted dental arches. It appears almost all thumb-suckers have a malocclusion caused or aggravated by the habit. Where no malocclusion exists bone character and other factors exist which have counteracted the habit. Good may be done by thumb-sucking

when a tendency to inferior protrusion exists. There are numerous causes, the main ones being insufficient feeding, vitamin deficiency, retarded growth, and psychological causes. Treatment is designed for both prevention and remedy. It must be decided when prevention is necessary—a pacifier is often the lesser of the evils. It may be necessary to refer the child to a paediatrician. Remedial measures usually are not taken until the child is five years of age as any malocclusion will correct itself if the habit ceases by this age. Force is not helpful. Appliances succeed only when the child is taught to realise that they are to help him. Attempts must be made to teach the child to help himself. A change of environment is often useful, but not always easy. Nagging and scolding must not be used. The cause of thumb-sucking must be removed before it successfully ceases. This habit occurs in 17 per cent. of children.

The habit of thumb-sucking may be "meaningful" or "empty" and there is no transition from the first to the second according to Mack[14]. He says the longer a fixed habit exists, the harder it is to break it. He believes that all abnormal sucking habits stem from incorrect feeding of the baby. Jaw growth is governed by heredity and environment, modified by malnutrition, disease, pressure and trauma. Thumb-sucking creates pressure which unbalances and alters the form of the dental arches. Bottle-fed babies are more apt to develop this habit. Sometimes some accessory movement or object accompanies the habit. If such an accessory movement is removed the habit usually ceases. Many psychiatrists do not believe in force to stop the habit for fear of a worse habit developing. As neurotic children are too unstable, restraint should not be used, otherwise however, restraint can be successfully used. Mack gives a list of twelve results of this habit, and also says that 17½ per cent. of malocclusions have a history of thumb-sucking. Negative or positive training by parents, ill-tasting medicines, finger guards, braces, and removable intra-oral appliances are most ineffective. Fixed intra-oral appliances, such as the hay-rake, palatal bar, or palated crib, are usually effective. The former is particularly useful for countering a tongue thrusting habit which tends to replace the thumb-sucking. The "meaningful habit" should be treated by the paediatrician, and the "empty habit" by the dentist; help is often needed from the psychiatrist.

It is interesting to note the divergence of opinion, particularly in the treatment of thumb-sucking. I feel that Lawes' and to a lesser extent Littlefield's approaches are rather negative. Lawes, particularly, has developed an over-psychological approach in his handling of the habit.

Nail-biting, according to Massler and Malone[15] has its beginning between three and 12 years, but almost disappears in adulthood. Forty per cent. of all school children are nail-biters, this being a "normal" habit between four and 18 years. Persistent biting is a symptom of internal tensions, the habit being a tension reducing mechanism, particularly under situational stress. No proof could be discovered of its effect on the dentition. Symptomatic treatment is useless.

There are intentional or planned pressures, and unintentional pressures according to Klein[16]. The latter are intrinsic or pressure habits within the mouth, extraneous or extrinsic-abnormal pressure habits on the face and functional pressures. Tongue habits, thumb-sucking, chin-propping, and incorrect swallowing habits are some of the most common pressure habits. The face yields easily to stimulus and pressure. Most damage is done during the transition period from the deciduous to the permanent dentition. The bone of a healthy child changes more readily than that of an unhealthy child. A biological as well as a mechanical knowledge is required to obtain stable results. All abnormal pressures should be eliminated as they are harmful and will upset planned treatment.

Fluhrer[17] says that poor sleeping positions and pressure leaning habits during the day are big causes of malocclusion. However, such pressure is only effective when the bone, due to illness or other factors, is not strong enough to resist them. Orthodontic treatment is unsuccessful while such causative habits continue. Lying on the face, or pressure caused by arms and hands during sleep are the main troublesome pressures. Hypothyroidism, scurvy, rickets, malnutrition and other endocrine disturbances are all highly potent aetiological factors which, in conjunction with pernicious sleeping habits, are among the most important contributing factors in dentofacial anomalies, and will cause relapse unless these conditions are eliminated. Photographs taken while the child is sleeping reveal that over 50 per cent. of children being treated exert these pressures for over 50 per cent. of their sleeping time. Such intermittent pressures are sufficient to bring about changes. In such a way pressures of 20 pounds are exerted, whilst pressures in orthodontic treatment do not exceed about 3 ozs. In overcoming these aetiological factors, full patient co-operation is essential.

Klein and Fluhrer have approached these pressure habits from two different points, with Fluhrer concentrating more on noctural habits and Klein more generally. One marked point of difference was Klein's statement that bone in a healthy child changes more readily than in an unhealthy child, while Fluhrer indicated that bone in an unhealthy child changes more readily.

Ankylosed temporary teeth, according to Silver[18] result in displacement of the permanent teeth, particularly in premolar areas. Such ankylosed teeth should be removed and the space maintained. Submerged teeth are nearly always ankylosed. Ankylosed permanent teeth result in other teeth moving to fill the space. All ankylosed teeth should be removed. Permanent teeth, although displaced by ankylosed teeth, usually right themselves if the ankylosed teeth are removed and the space retained.

Tager[19] over a period of years, examined over 100 children who presented special orthodontic problems with regard to endocrine or metabolic disturbance. Ten per cent. revealed some endocrinopathy, all of which were hypothyroidic in some degree except one case of hypopituitarism. All those suffering from hypothyroidism responded to thyroid therapy. Various asymmetries of the face, orbit, optic nerve size, length of extremities and size of the chest, showed a marked constriction of the oral cavity on the same or counterlateral side coupled with delayed dentition and crowding.

One case of Turner's Syndrome, with typical understature and webbing of the neck demonstrated marked recession of the mandible, delayed dentition and delayed bone development. The other cases fell into the category of rapid growth in height with slow sexual maturation. Root resorption, architectural abnormalities of the mandible and/or maxillae were common. During such a period dietary or metabolic insufficiency can be caused by the rapid growth outstripping the supplies.

Tager reminds the orthodontist that such conditions occur, and may be encountered, at any time, although not continuously. The orthodontist should be on the lookout for them, but not find them where they do not exist. However, when suspect, consultation with the child's physician is necessary. The observations revealed in this paper are important and are useful in placing these causes of orthodontic cases and problems in their correct perspective.

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A Comparison of Three Modern Haemostatic Agents Commonly Used by the General Practitioner*

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It is proposed to give a general outline of the literature on the history and use of haemostatics and finally to report on a study conducted at the Queensland University Dental School. Oxidised cellulose, calcium sodium alginate and gelatin sponge are the three under discussion.

The main reason for making the review and investigating these products under local conditions was in answer to numerous enquiries from students and practitioners. Many of the over-enthusiastic reports by some of the agents for the various commercial firms were extracted from studies done, it was believed, on far too few cases. It was felt that a comparative study would be desirable, with particular interest in their influence on pain and healing, and also on haemorrhage.

When one is to consider any dental material, it seems to be the custom to evolve a list of desirable properties. Sutton[1] has done this in relation to haemostatic agents which are to be enclosed in a wound. His list is as follows:—

1. *Absorption*: if immediate closure of a wound is to be obtained, it is first essential that any agent placed in the wound be completely absorbable.

2. *Haemostasis*: it is desirable to prevent such oozing or slight bleeding as would cause increased pain and swelling; therefore, the material *per se* should possess such properties or allow incorporation of a suitable haemostatic agent.

3. *Bacteriostasis*: material should either possess bacteriostatic properties in itself or be a suitable vehicle for such agents; preferably the latter, thus providing a means whereby a choice of antibiotics could be used.

4. *Non-antigenicity*: the material should be free of the danger of inducing a sensitivity and accompanying possibility of resulting anaphylactic reaction.

5. *Clot supporting property*: the material should have physical properties which would help *maintain the structure* of the blood clot and at the same time *not interfere* with the normal reparative processes.

6. *Non-irritability*: the material should be of such a nature as to preclude the possibility of mechanical or chemical irritation.

7. *Sterilizability*: material when used must be sterile to preclude the introduction of foreign organisms into the surgical field.

8. *Ease of Use*: a desirable feature is one that allows for simplicity and ease of use.

9. *Availability*: the supply must be assured and at a cost not prohibitive to routine use.

Let us consider the properties of and the literature on each of these three agents in turn: Oxidised cellulose, calcium-sodium alginate and gelatin sponge, and then finally a report on the study done at the Queensland Dental School.

Oxidised Cellulose.

The first report on the oxidising of cellulose appears in 1883, when Witz published the results of some preliminary studies he had made on the action of various oxidising agents on cellulose.

The major difficulty encountered in oxidising cellulose from various sources was in producing materials which were homogenous in chemical and physical properties. When oxidation is mild, products usually consist of an oxidised portion and an unchanged residue of unreacted or slightly modified cellulose. With

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drastic oxidisation there is naturally a larger proportion of oxidised material but this is invariably accompanied by increased degradation. When this happens the oxidised product is friable, easily powdered and consequently very difficult to handle.

This was the state of affairs until February, 1941, when two American scientists, Yackel and Kenyon[2] patented a method which they had developed. They found that NO_2 (nitrogen dioxide) produced a new type of oxidised cellulose (under suitable laboratory conditions).

Furthermore, this NO_2 method of oxidation could be readily controlled to produce oxidised celluloses of various carboxyl group contents. Moreover, the physical form of the gauze or cotton was still retained although its tensile strength was about two-thirds that of the original fabric.

When the various oxidation products were investigated in the laboratory it was found that if the degree of oxidation was sufficiently high (the carboxyl content greater than 13 per cent.) the products would dissolve rapidly and completely in dilute aquaeous alkalis, e.g., 2 per cent. aquaeous sodium hydroxide.

Because of this solubility in dilute aquaeous alkali, Frantz[3] suggested that the product should also be capable of gradual dissolution when placed in contact with relatively undamanged animal tissue. Using dogs and cats as experimental animals, she found that oxidised cellulose was completely absorbed after implantation in various body tissues. The material was more slowly absorbed when trauma or infection had caused a greater inflammatory response. Frantz explained this retardation as being due to the less alkaline state of these greatly inflamed tissues.

Chemical sterilization of oxidised cellulose is necessary as it does not withstand autoclaving nor boiling for more than three minutes.

Putnam is credited with having done the first clinical work, using oxidised cellulose in combination with topical thrombin. Because of its low pH (4), oxidised cellulose inactivates thrombin (and penicillin). It is therefore necessary to neutralise the oxidised cellulose by immersion in a 1 per cent. solution of sodium bicarbonate, before being soaked in the thrombin solution.

Haemostatic Effect.

It was later noted that oxidised cellulose used without thrombin produced a satisfactory haemostatic effect as oxidised cellulose itself has a specific haemostatic action when applied to a bleeding wound Gwinn *et al*[4] explain this action as being due to at least two factors:

1. The slightly acidic nature of the oxidised cellulose (as suggested by Light[5]).
2. The swelling which occurs as the material (introduced as dry material into the wound) becomes soaked with blood (as suggested by Frantz *et al*[6]).

Other writers attribute the haemostatic effect to the formation of coagula consisting of salts of oxidised cellulose and haemoglobin.

Tissue Reaction and Absorbability.

Most writers seem to agree that there is some early tissue reaction after the use of oxidised cellulose, but that it is not marked. Nathan[7] says that

> as a rule, the region into which gauze was packed became swollen. Adjacent areas frequently became indurated and in some instances ecchymotic. After the initial engorgement, healing usually follows quickly.

Frantz and workers[8] say that if allowed to remain on the surface of open wounds, epithelialization seems to be retarded.

In comparatively large serious cavities, where big quantities of the material are inserted, Frantz *et al* noted the occasional appearance of "cysts." The complete disappearance of the oxidised cellulose in such cases was then considerably delayed, but these cysts did eventually resorb.

Besides retarding epithelialization of open wounds, oxidised cellulose seems to delay the formation of callus in clean experimental fractures. Because of this property, oxidised cellulose has been used in the treatment of joint ankylosis to maintain space, control haemorrhage and prevent a recurrence of the ankylosis. No significant delay, however, has been noted when the oxidised cellulose has been used in open lacerated compound fractures. This, say Gwinn *et al*, would correspond to its use in tooth sockets.

Dental Applications.

Because of the friability of the coarse meshed gauze, Nathan prefers the cotton type. Further, he reports that better results were obtained when he used the least number of small pieces necessary to control the haemorrhage. The clot usually extended from the socket when large pieces were used, and occlusal trauma to this mass frequently caused further haemorrhage.

Reports.

Gwinn, Grimm and Ferber[4] inserted oxidised cellulose in 57 sockets. They found that there was no retardation of the healing process and no greater amount of pain in these than in controls.

Nathan[7] carried out a similar experiment packing 80 sockets with oxidised cellulose and having 20 controls. Of these 50 per cent. were routine extractions, 21 per cent. were complicated, 29 per cent. complex (e.g. impactions), history of previous bleeding in 14 cases. He found that:

haemostasis was usually rapid.
five patients experienced pain.
There was no necrosis, pyrexia, allergy.
Average healing time was 2 to 3 days.

Alginates.

The commercial alginate wools and gauzes currently used as haemostatic agents are composed of sodium and calcium alginate, derivatives of alginic acid. Alginic acid is a high polymer of d-mannuronic acid and is produced commercially from certain seaweeds. This was first isolated by Stanford in 1884. It is extracted from seaweed with sodium carbonate solution. After dilution, the extract is filtered, bleached and sterilized with sodium hypochlorite, and then acidified with dilute HCl to precipitate the alginic acid. The latter, after being washed, is neutralised with sodium carbonate solution to give soluble sodium alginate.

When one looks at the formula for alginic acid, it is noticed that the long-chain molecules carry free carboxyl groups at regular intervals along their length. As already indicated, the sodium salt of alginic acid is soluble in water, but insoluble salts are readily prepared by the double decomposition of sodium alginate and salts of bivalent (e.g., Ca, Ba, Pb) and trivalent e.g., Al, Fe, Cr) metals. Insolubility is, of course, conferred by the linking together of the carboxyl groups in neighbouring chains by the metal atoms.

Since sodium alginate dissolves in water to give solutions of high viscosity, whereas calcium alginate is insoluble, filaments are readily obtained by extruding sodium alginate through suitable spinerettes into, say, calcium chloride solution. In this way, yarns of satisfactory appearance and easy to handle have been produced.

An aquaeous solution of sodium alginate when acted upon by ionic calcium, undergoes instantaneous coagulation. (It is actually this characteristic which helps repair any injury to the species of seaweed from which the alginate is derived.) When the seaweed is broken or damaged in water, the injury is healed by the plant juices coming into contact with the calcium ions of the sea water. The coagulum thus formed seals the wound.

Clinically it was found that sodium alginate, in contact with blood and tissue exudates, forms an artificial clot because of the reaction with the calcium ions present but the haemostatic effect was slow and unreliable.

The absorbable haemostatic alginate (wool or gauze) now locally used is a mixture of calcium alginate and sodium alginate.

By varying the ratio of sodium alginate to calcium alginate, products may be made with varying absorption rates. Most supply companies market two types, a slow and a fast.

Such an alginate haemostatic is neutral in reaction and exerts no inhibitory effect on penicillin, streptomycin or the sulphonamides.

Its haemostatic effect is not completely understood, but it has been suggested that its action is probably more physical than chemical.

Absorbability.

Blaine in 1947[9] carried out a number of experiments to determine the behaviour of calcium alginate in animal tissues and he noted complete absorption in every case.

Dental Reports.

In 1936 Smith[10] examined the effects in 100 sockets. He found that haemorrhage was controlled and that there was prompt healing.

Brown[11] reported on the successful haemostatic results obtained in three cases with the use of alginate gauze packed into sockets.

Sandy states[12]

The most impressive feature was the very high proportion of patients who reported a complete absence of further haemorrhage and almost a complete absence of post operative sequaelae.

Gelatin Sponge

In 1945 Correl and Wise[13] reported the production of an absorbable sponge composed essentially of gelatin and designed primarily for haemostasis. The gelatin sponge is prepared by converting gelatin, a soluble non-specific protein, into an insoluble but absorbable material. Silverman[14] says this is done by foaming a specially prepared skin-gelatin solution. When the desired porosity is obtained, the product is air-dried in monel metal moulds, sterilized by dry heat at 149 deg. C. and packaged in sealed jars.

The Accepted Dental Remedies lists its properties thus:—

Gelatin sponge is a light, off-white, non-elastic, tough, porous matrix that may be cut into any shape or size. It shows no tendency to disintegrate, even with relatively rough handling. When worked vigorously between moistened fingers it will imbibe water readily. It will take up approximately 50 times its weight of well agitated oxalated whole blood.

Absorbability.

In 1946 Jenkins *et al*[15, 16] conducted a series of experiments on dogs plus observations in clinical cases. Gelatin sponge was found to be an effective haemostatic agent. They used gelatin sponge with and without thrombin in 30 dogs. A more rapid haemostatic effect was obtained when thrombin was used, but the gelatin sponge itself was shown to possess haemostatic properties.

In 1948 Sandy using implants into thigh muscles of two rabbits, noted that the gelatin sponge was almost completely absorbed in 25 days.

Bacteriostatic Property.

Jenkins and Clarke drew attention to the fact that, since gelatin is an extremely good culture medium for bacteria, its use might be contraindicated in contaminated wounds. Since gelatin sponge is compatible with penicillin, it has been suggested that penicillin be used with the gelatin sponge in cases where bacterial contamination is present.

Non-antigencity.

Investigations by Silverman and Light[14] would indicate that gelatin sponge is a non-antigenic material.

Haemostatic Effect.

Although gelatin sponge has been used with thrombin in neurosurgery, it has been found that thrombin is not necessary for most oral surgery procedures. The sponge itself has sufficient haemostatic properties.

The mode of action in arresting haemorrhage is not fully understood. It seems possible that the haemostatic properties are provided by the nature of the sponge itself. Secondly, the gelatin sponge itself acts as a matrix supporting the blood clot. When fibrin is deposited in the interstices, it binds the matrix to the surface of the wound.

Dental Applications.

In 1947 Berg[17] used gelatin sponge (without thrombin) in a series of extractions in 20 cases and reported immediate control of haemorrhage, followed by rapid healing.

In 1948 Sandy reported the use of gelatin sponge in 12 cases of which 6 were apicoectomies, 2 were removals of cysts and 4 were surgical extractions—unerupted, impacted or difficult teeth.

He found bleeding and post-operative pain were at a minimum. Healing was accelerated.

Comparative Histological Study of the Effect of Haemostatic Agents on Healing of Extraction Sockets.

In 1950 Jacobs and Rafel[18] made a comparative study of the effect on healing of oxidised cellulose, gelatin sponge (and fibrin foam). Silverman had previously studied the effect of gelatin sponge, but had used it in conjunction with thrombin and penicillin. Gwinn, and workers had studied oxidised cellulose and fibrin foam as in conjunction with sulphathiazole.

Jacobs and Rafel say that it has been shown that the addition of sulphapyridine or penicillin not only hastens haemostasis, but also alters the nature of the clot. They therefore used the haemostatic agents without any adjuncts. They made a comparative microscopic study of (fibrin foam) gelatin sponge and oxidised cellulose in the sockets of extracted mandibular teeth in one dog. They determined the degree of absorbability, effect on healing and inflammatory response. Unfortunately, the study by Jacobs and Rafel is limited in value, as only one animal was used. Furthermore, it has been shown that the healing rate in the dog is greater than in man. Relative material from their study, however, might suggest that:

Gelatin sponge is completely absorbed before oxidised cellulose.

Clot formation is retarded by the use of either gelatin sponge or oxidised cellulose.

Inflammatory response is present in all sockets (including controls) and is possibly the result, then, of the trauma of the extraction.

The bone bridging of the healing socket appears to begin near the crest of the alveolar ridge.

Epithelialization is retarded by both gelatin sponge and oxidised cellulose.

Bone resorption and bone deposition are not altered by the use of gelatin sponge or oxidised cellulose.

Method and Purpose of This Study.

The purpose of this experiment was to make a comparative clinical study of the effect of three absorbable haemostatic agents on

haemorrhage, post-operative pain and healing following routine extractions. The three haemostatic agents studied were oxidised cellulose (wool form), calcium sodium alginate (wool form) and gelatin sponge. A number of untreated sockets were sutured (mattresses or uninterrupted) and these were included in the comparative study.

It is important to remember that in any such clinical assessment of the value of these materials, there are many factors which are difficult, if not impossible, to rigidly control. Firstly, it is not possible to make any accurate allowance for the great variation in individual tolerance of pain and discomfort. Secondly, we should consider those many local and general or systemic conditons which may favour or retard repair. All of the following have a bearing on haemorrhage, post-operative pain and healing, and many of them are difficult to control:

1. Vitality and anatomical peculiarity of the tooth removed.
2. Condition of the periodontal tissues.
3. Oral hygiene.
4. Anaesthetic factors.
5. Mechanical effect of extraction.
6. Management of the wound.
7. Infection from the saliva.
8. General lowered resistance with or without a specific debilitating disease.
9. Age of patient.
10. Dietary considerations.

In this study cases requiring multiple extractions were used, so as to provide a control on the same mouth under conditions similar to the experimental case. At first bleeding and coagulation times were done, but this was later discontinued and patients with good medical histories were picked at random from routine extraction cases. No complicated surgery was included in this study, all the sockets being from simple extractions. The one dentist did all of the extractions under general anaesthesia.

The large quantity of agent in each original commercial bottle was divided under sterile conditions into a number of smaller portions and stored in sterile bottles. An optimal amount was then readily available at the time of operation. The manufacturer's directions were followed in the preparation of the material for use but very little information was available in regard to the amount to be used in an extraction socket. Short preliminary trials were therefore necessary before a satisfactory method was found for the insertion of each agent.

The following technique was finally adopted:—

By means of an aspirator and/or sterile gauze, the socket to be implanted was dried immediately after extraction. A piece of the haemostatic agent, approximately one half to two-thirds the size of the socket, was then inserted well into the wound, where it filled with blood and swelled to the volume of the socket.

A different haemostatic agent was used on each consecutive patient. The control sockets were treated as routine extractions. The patients were made to rest for 30 minutes and post-operative haemorrhage was checked before they were allowed to leave.

The sockets were checked post-operatively at 24 hours, 8 days, and 14 days. At each post-operative appointment observations on haemorrhage, pain and healing were recorded on a blank card, and transferred later to the record card. By this "blind-checking" it was felt that personal error and bias for a specific agent would be minimised.

Post-operative pain was determined by the subjective symptoms of the patient, but it is very difficult to record significant figures, as patients' "thresholds" very tremendously. Their descriptions were classified under the headings none, slight, severe (terms often used by patients). A mild pain occurring up to four hours post-operatively was graded as slight; marked pain of much longer duration (often associated with a sleepless night) was graded as severe.

A similar grouping was used for post-operative haemorrhage. No cases of secondary haemorrhage occurred throughout the study.

From the results of studies done by Mangos[19, 20] and Christopher[21] on the healing of extraction wounds, it was decided in this study to use the nature of the blood clot and the rate and extent of epithelialization as the clinical gauge in evaluating the rate of healing. The histologic studies just mentioned showed that the epithelium had proliferated almost across the socket by the eighth to tenth day. On the 14th day the healing socket was completely filled with organizing blood clot and the surrounding surface was completely covered with epithelium. In the present study a preliminary series was conducted, so that the observer would have some clinical yard-stick by which to gauge and compare the rate of epithelialization. There in considerable variation in any clinical observation of this nature, and for this reason a +,++,+++,++++ grading of the average was not used. Instead, poor-good tabulation was chosen, good including any socket healing within the boundaries of average or normal.

RESULTS.

		Oxidised Cellulose	Gelatin Sponge	Alginate	Sutured	Control
Haemorrhage	None	77	76	100	81	126
	Slight	14	13	43	4	61
	Severe	6	4	11		6
Pain	None	88	70	100	79	152
	Slight	8	14	50	6	35
	Severe	1	3	4	1	6
Healing	Poor	4	2	43	1	4
	Good	97	86	102	85	192

It was decided to examine all sockets on the eighth post-operative day, at which time it was usually possible to classify "good" or "poor" healing. The fourteenth day appointment was a useful check, particularly with those on the borderline at the eight-day period.
Altogether 630 cases were examined.

Haemorrhage.

Figures for the control wounds and those treated with alginate are almost the same, so alginate is not an effective haemostatic agent. Wounds treated with oxidised cellulose, gelatin sponge or suturing were highly significantly better than the controls (a similar result would occur by chance less than once in a hundred times). The figures for suturing are significantly better than gelatin sponge and oxidised cellulose.

Pain.

Wounds treated with oxidised cellulose, gelatin sponge, or suturing were highly significantly better than the controls (a similar result would occur by chance just less than once in a hundred times). Wounds treated with alginate were significantly worse than the controls (a similar result would occur by chance less than once in twenty times).

Healing.

There is no significant difference in healing between wounds treated with oxidised cellulose, gelatin sponge, or suturing, and the control wounds. Calcium-Sodium alginate wounds show a highly significant difference from other wounds; similar poor results would occur by chance much less than once in a hundred times.

CONCLUSIONS.

Oxidised cellulose, gelatin sponge and suturing are effective haemostatic agents; they reduce post-operative pain, and do not retard healing. Calcium-sodium alginate wool is not an effective haemostatic agent; it increases post-operative pain, and retards healing.

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The Australian Society of Orthodontists

Case of the Year*

I. *Case Analysis.*

A. History. A boy, aged 14 years and five months, presented a Class II, Division I (Angle) malocclusion. According to Fischer the malocclusion could be diagnosed as a mesial movement of the upper arch. There was an early thumb sucking habit, but rather large lips kept well together prevented spacing of the upper anteriors. Tonsils had been removed at the age of six, and correct breathing resulted in well developed nasal passages. He was an intelligent and interested child and very co-operative towards treatment.

B. Cephalometric appraisal.

Downs Analysis.

The Facial Angle and Y Axis and the large mandibular plane angle indicate a slight distal position of the mandible. This is further proved by the cant of the occlusal plane, the angulation of the lower incisors to the mandibular plane, and the upright position of the upper canine.

C. Dental Examination. The mouth hygiene was excellent and caries susceptibility very low. The upper right canine had not erupted

Fig. 1.—Before treatment.

Fig. 2.—After treatment.

	Skeletal Pattern			Patient		
	Min.	Max.	Mean	Before	After	Change
Facial Angle	82	95	87.8	80	80.2	.2
Angle of convexity ...	— 8.5	10	0	6.5	3.5	3
A-B to Facial plane ...	— 9	0	— 4.6	—7	— 4.1	2.9
Mandibular Plane angle ...	17	28	21.9	34.5	34	.5
Y Axis	53	66	59.4	68.3	68.1	.2

**The Australian Society of Orthodontists is pleased to announce the establishment of a "Case of the Year" project as a stimulus to orthodontic case reporting among its members, believing this to be of mutual benefit to the Society, the participating members and the profession.*

Once each year members are invited to submit suitable cases for round table discussion and possible publication as from the Society. The first of the series is published herewith, the report having been submitted by Mr. R. G. Henry, M.D.S., and accepted by the Council of the Society, as being a sufficient standard and interest to merit the Society's choice in this instance.

DENTURE TO SKELETON

	Min.	Max.	Mean	Before	After	Change
Cant of occlusal plane	1.5	14	9.3	17.5	17.3	.2
/1 to $\overline{/1}$	130	150.5	135.4	121	128	7
$\overline{/1}$ to mandibular plane	− 8.5	7	1.4	7	7	0
$\overline{/1}$ to occlusal plane	3.5	20	14.5	24	24.1	.1
Distance of /1 to facial convexity plane $\overline{AP}$	−1	5	2.7	11	7	4

and this was one reason for seeking orthodontic treatment. X-ray revealed the canine in good position, but wedged between the lateral and first bicuspid. Measurement showed that 4 mm. more space would be required before the tooth could erupt. Centre line disharmony resulted from the movement of the upper anteriors to the right 1.7 mm.

Summary and Etiological Factors.

1. Heredity was felt to be the largest contributing factor.
2. The condition was aggravated by the thumb sucking habit.
3. Good lip control prevented the flaring of the upper anteriors and helped crowd out the upper right canine.

II. *Treatment Plan.*

The excellent arch form in the lower and the large lower incisal angle gave little hope of using this as anchorage. The distal movement of the entire upper arch—moving the buccal segments first to make room for the unerupted canine was decided upon using cervical anchorage.

Mechanical Therapy. Two bands of .005 "Inconel" were cemented to the upper first permanent molars. To these bands had been soldered buccal tubes to receive .045 in. round wire.

A double bow arch was fitted, the inner arch being .045 in. and the outer .051 in. diameter. Stops were soldered, so that in position the arch stood away from all the teeth anterior to the first molars. Thus when a distal force was applied it would act entirely upon the molars.

Elastic traction was derived from a piece of flat elastic 1 inch in width which passed around the back of the neck and was attached to the outer arch by two hooks sewn to the elastic.

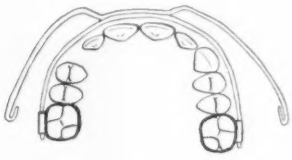

Fig. 3.

A pressure of approximately 1lb. was applied.

The appliance was worn every night for nine months, by which time the canine had erupted and the upper arch had moved distally into correct occlusion. Retention consisted of the gradual relinquishing of the appliance over a period of another four months. Figs. 5 a,b,c, illustrate the case before and after treatment.

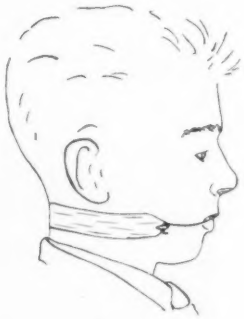

Fig. 4.

III. *Appraisal of Results.*

1. The four mm. space necessary for the eruption of the upper right canine was gained by the distal movement of the buccal segments.

Fig. 5.—(a).

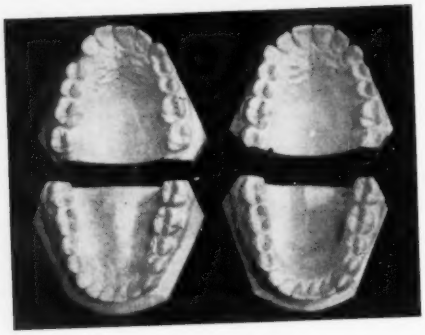

Fig. 5.—(b).

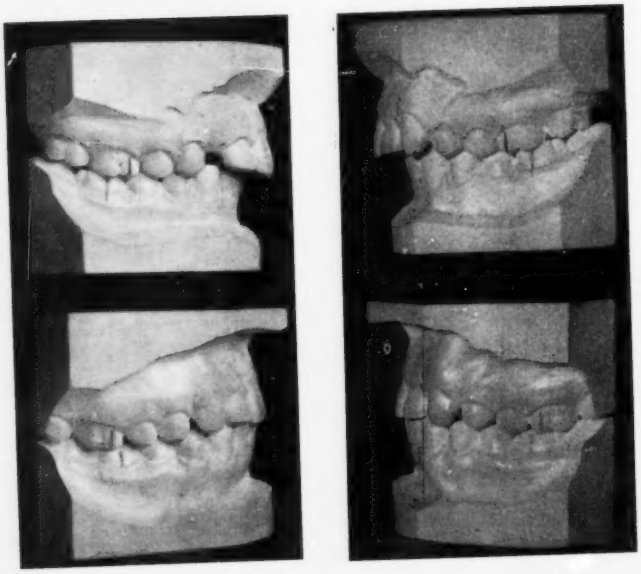

Fig. 5.—(c).

2. When sufficient space for the canine was present, the arch was allowed to contact the anteriors and thus entire distal movement of the upper arch was obtained.

3. An improvement of the facial profile.

Cephalometric Changes. The changes were limited to the upper arch almost exclusively. The only alteration to the lower was a result of altered masticatory and occlusal forces.

There is a marked improvement of the facial covexity—AB to facial plane— $\underline{/1}$ to $\overline{/1}$ and the distance of $\underline{/1}$ to A.P. while most other measurements remained unaltered to any degree. This was a direct result of the distal movement of the upper arch.

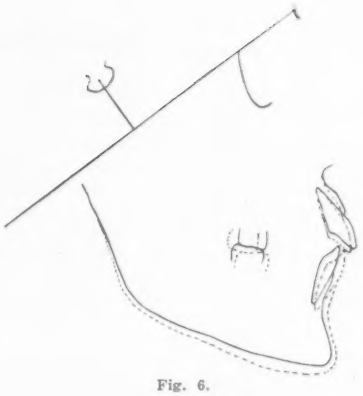

Fig. 6.
—— Before.
- - - After 9 months.

Letter to the Editor

Sir,

There are many and varied methods in use today for the treatment of infected root-canals. Some operators still prefer to use the drugs which have been in use for a considerable time, such as creosote and eugenol, whilst others have adopted polyantibiotic therapy.

However, there has been little attempt to develop the use of some of the newer chemotherapeutic agents, many of which have the desirable properties of a re-agent for sterilising root-canals, namely a wide spectrum of antibacterial activity, low toxicity for the tissues, ease of manipulation and stability during heat sterilisation and storage. This prompted us to investigate the efficacy of certain chemotherapeutic drugs, because the use of life-saving antibiotics could lead to the development of sensitivity in patients to these drugs or to the production of resistant strains of organisms.

Tests were carried out in which were used samples of saliva, cultures from infected root-canals and cultures of certain strains of organisms known to occur in root-canals and to be resistant to the action of most of the commonly used medicaments and antibiotics. It was found that a mixture of 0.25 per cent. Monacrin (5 amino acridine hydrochloride—Bayer) 0.2 per cent. Cetavlon (alkyl trimethyl ammonium bromide—I.C.I.) 0.2. per cent. methyl Nipa ester (methyl parahydroxy benzoate—Watts/Winter), 0.05 per cent. propyl Nipa ester (propyl parahydroxy benzoate—Watts/Winter), adjusted to pH 6.5 to 7.0 is capable of destroying all organisms tested under the conditions of the experiment.

This aqueous solution can be used for irrigation and dressings. Our method for use is as follows:—

The thoroughly cleansed root-canal is gently irrigated with 3ml of the above solution. Without drying, a paper point, also moistened with the solution, is introduced into the canal, the opening into the pulpal chamber dried and an inner seal of gutta percha and an outer seal of zinc oxide and eugenol placed in position. The canal is irrigated with saline only prior to taking a sterility test or before the tooth is root-filled. Dressings are changed every two days.

An *in vivo* test of this mixture is now being carried out and results will be published elsewhere.

—H. R. SULLIVAN
M. JOLLY

Department of Operative Dentistry,
University of Sydney, and
Institute of Dental Research,
United Dental Hospital, Sydney.

Chronic Desquamative Gingivitis

G. T. Hutchinson, M.D.S., F.D.S, R.C.S. and Margaret R. Dewar, B.Sc., Ph.D.†*

Chronic desquamative gingivitis is a rare condition found most frequently in women during or after menopause.[1] The main sign is the loss of the epithelium from the free and attached gingiva (and occasionally from the oral mucosa), areas most commonly involved being the labial surfaces of the upper and lower anterior segments. The development of small vesicles may occasionally precede the loss of epithelium, so that the mucosa reveals a deep red, glistening surface of denuded connective tissue.[2] The junction with the normal mucosa is not clear-cut. The patient may complain of a burning sensation, spontaneous haemorrhage and pain during mastication and on pressure.

The epithelium regenerates gradually over the denuded areas but breaks down again at irregular intervals. The condition then becomes recurrent with a duration of many years.[3]

Aetiology.

The predominance of the disease amongst females, particularly those undergoing hormonal change, has led to the assumption that the sex hormones are involved.[4] Gersh and Catchpole[5] believe that connective tissue cells can liberate "collagenase-like" enzymes following either a local or systemic hormonal stimulus. The enzymes bring about changes in connective tissue fibres and ground substance, which may be demonstrated by suitable staining techniques. The basement membrane of the epithelium (essentially a condensation of the ground substance), the intercellular cementing material of the epithelium and the connective tissue ground substance diminish.

Histopathology.

The epithelium shows many signs of degeneration[6], the basement membrane of the epithelium is absent and the interpapillary processes of the epithelium tend to disappear or become less distinct.

The connective tissue fibres are diminished in number and the connective tissue is infiltrated with inflammatory cells—probably a secondary phenomenon due to degeneration of the epithelium. This infiltration begins at the oral surface of the marginal gingiva and this particular feature serves to distinguish it from the foci of inflammatory cells arising from the gingival crevice in marginal gingivitis or periodontitis.

The combination of degeneration of the epithelial basement membrane and connective tissue is responsible for the characteristic separation and loss of the epithelium.[2, 6]

Treatment.

Ziskin[2, 7] was the first to use oestrogenic hormones in the treatment of desquamative gingivitis; his rationale was based on observations of the keratinizing effect of these hormones on the oral mucosa. He obtained successful results after numerous topical applications. However, this treatment is not without danger, because these hormones are carcinogenic agents.

Unfortunately parenteral administration of the hormone does not appear to be as effective as topical application. This may be due to the fact that systemic administration does not make the local keratinizing effect of the oestrogens available. Also the so-called "menopausal symptoms" are considered to be due not so much to a reduced oestrogen production[8] as to a change in balance of the gonadotrophic and ovarian hormones.

Although hormonal treatment is still far from satisfactory, treatment directed towards existing endocrine disturbances is more likely to succeed than is any of the multiplicity of remedies advocated in the past.[3] Such procedures as extensive removal of the affected mucosa or the topical application of caustics are attempts to treat a systemic disease locally. They are not successful and must be trying to the patient.

Case Report.

History.

General. G.B., spinster, aged 43, was referred to the United Dental Hospital in March, 1954, by her physician for investigation as to whether dilantin sodium was the cause of her oral condition. The patient has suffered from epilepsy for many years but it has been controlled successfully by dilantin sodium for fourteen years. Recently she has developed many diverse complaints which her physician considers could adequately be designated as "menopausal symptoms".

Oral. In December, 1953, the patient complained to her physician of a burning sensation in her mouth and of bleeding gums too sensitive to allow her to eat hard food. She

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†Dental Board of N.S.W., Research Officer, Institute of Dental Research, United Dental Hospital of Sydney.

also said that "the skin appeared to be coming off my upper gums". The symptoms passed only to recur more severely in March, 1954.

Examination.

The patient was a well-built, middle-aged woman in apparent poor health. Her pronounced lethargy may have been due to the barbiturate which had been substituted for the dilantin sodium.

Oral examination revealed a well cared for mouth with teeth and gingival margins in excellent condition. There was no evidence of a gingival hyperplasia associated with the dilantin sodium treatment.

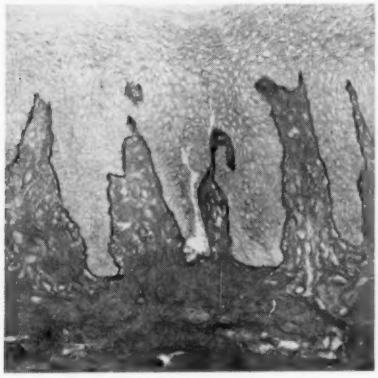

Fig. 1.—Section of normal gingiva, stained by Hotchkiss technique to reveal mucopolysaccharide basement membrane and connective tissue ground substance. (Magnification approx. 100 X.)

The oral mucosa and attached gingiva were pale pink, with the exception of the labial surfaces of the upper and lower anterior segments where extensive areas, completely denuded of epithelium were a shiny, deep red. They were sensitive to touch and gentle rubbing with a gauze swab elicited multiple pin-point haemorrhages from the exposed connective tissue papillae. Strips of easily-removed epithelium were visible and one small vesicle was seen.

A diagnosis of desquamative gingivitis was made. This was confirmed by a study of biopsy material which revealed loss of the basement membrane and disruption of the connective tissue (see Figures 1 and 2).

Treatment.

Her physician was advised that the oral lesions were not related to the dilantin sodium treatment. He also agreed to institute the usual hormonal treatment (e.g. 0.5-1.0 mg Stilboesterol per day, or oestrone 3,000-6,000 I.U. daily taken by mouth). The patient was instructed to eat a suitable non-irritating diet[9] and to avoid damaging the areas with her tooth brush.

The epithelium regenerated slowly and up to the present there has been no further ulceration, although the epithelium is much thinner over the affected areas than is normal.

It cannot be determined whether the improvement is due to the hormonal treatment; it may be only a phase in the fluctuating course of the disease. However, no local treatment was required to gain the present clinical improvement.

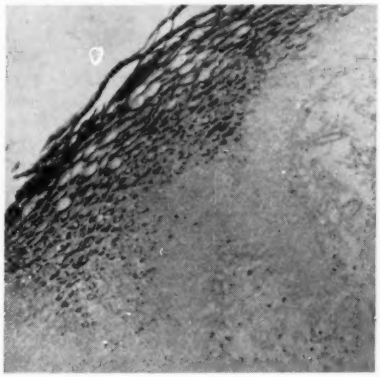

Fig. 2.—Section of the affected gingiva, stained by Hotchkiss technique. The basement membrane is absent and connective tissue ground substance is greatly diminished. The heavy deposit in the epithelium is glycogen, which occurs in all inflamed gingivae. (Magnification approx. 100 X.)

ACKNOWLEDGMENTS.

We wish to thank Mr. E. Slater, Department of Photography, United Dental Hospital of Sydney for preparing the photomicrographs. Acknowledgment is also made to the Superintendent of the United Dental Hospital for permission to publish this paper.

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Editorial

This journal is published by the Australian Dental Association (New South Wales Branch), B.M.A. House, 135 Macquarie Street, Sydney. Communications concerning literary matter should be addressed to the Editor and all advertising and business matters directed to the Secretary.

Subscription rate is £1/5/- per annum (Aust.); £1/10/- per annum outside Australia. Single copies, 5/-.

Original communications: Manuscripts should be typewritten on one side of the paper only, with double spacing and liberal margins. Carbon copies should not be sent. References should be placed at the end of the article and should include, in the order given, name of author, title, journal, volume, initial page of article, month and year; e.g., Wallace, J. S.—The newer knowledge of hygiene in diet: Dent. Items Int., 69:38 (Jan.) 1947. References to books should include the following information: name of author, title, edition, place of publication, name of publishers, year and page (if necessary).

Illustrations: These should be kept to a minimum. Suitable captions with number and author's name should be marked on the back of all illustrations. Photographic prints should be approximately 5 in. x 4 in. and printed on glossy paper. Authors unaccustomed to preparing drawings and photographic prints for reproduction are invited to seek the advice of the Editor.

All expressions of opinion and all statements of supposed fact are published on the authority of the writer over whose signature they appear and are not to be regarded as expressing the views of the Australian Dental Association.—H. R. SULLIVAN, Editor.

The Federal Council

The Annual Meeting of the Federal Council of the Australian Dental Association held on 16th October marked the conclusion of a period of four years during which the Federal Office has been located in Sydney. It is therefore an appropriate time to review the current activities and the progress of the Association affairs on the national level.

Many socio-economic and dental health problems which appear important and urgent to members of one Branch are often viewed as isolated issues confined to that State. Generally they are national problems finding acute expression in more than one State. The primary function of the Federal Offices is to watch these trends and developments along with their political impacts on either a Federal or State level. Usually it will be found that a Commonwealth-wide pattern emerges. Such information together with the considered opinions and advice of the Federal Offices is conveyed to the State Branch Councils or Executive Committees for due deliberation, and finally it is presented to the Federal Council for majority decision and policy approval. The importance of each State Branch viewing its problems in conjunction with the Federal Office is evident and this willing co-ordination during recent years has proved valuable to all Branches.

Amongst the matters discussed at the Federal Council Meeting a few may be briefly mentioned. The most important was the Local Repatriation Dental Officer Scheme for the dental treatment of repatriation beneficiaries which, after long negotiation, has been successfully established throughout the Commonwealth. As in all new schemes certain lesser administrative difficulties have occurred. However, it is gratifying to see the satisfactory culmination of this intricate problem.

Pharmaceutical and Commonwealth Medical Benefits have received much discussion and attention. The present position may be summarised in the remark of the Minister of Health, the Rt. Hon. Sir Earle Page, who said:—

> Until more experience has been gained in the operation of the partnership of the Commonwealth and the organisations in providing health insurance, it would not be possible to extend the scope of the Medical Benefits Scheme to cover services rendered by members of the allied professions.

The fluoridation of drinking waters as a preventive measure has received considerable impetus this year and several significant decisions of Commonwealth-wide import have occurred. The National Health and Medical Research Council resolved to recommend the institution of fluoridation procedures and set out the Council's finding in relation to the scientific control of such projects. A second resolution recommends that each State set up an advisory panel within its Health Department to review, advise on and supervise proposals for the fluoridation of communal water supplies. The B.M.A. Federal Council had formerly endorsed the findings of the National Health and Medical Research Council at the request of the A.D.A. Finally, the Federal Council on 16th October passed very strong commendatory resolutions supporting this preventive project. The endorsement by the General Assembly of the Federation Dentaire Internationale indicates the world-wide recognition of this valuable measure.

A turning point in the history of the Association must be recorded. The Federal Council by unanimous decision approved the establish-

ment of a national journal to be called the Australian Dental Journal. Previous attempts have been made to reach this great objective without success. The generous attitude of the bodies with vested interests controlling existing publications greatly contributed to this decision which will consolidate the interests of the profession and raise our prestige both nationally and internationally. It is hoped that this great unified achievement will result in the first issue of the new national journal in July, 1955.

The meeting terminated with the biennial election of federal officers. This election was conducted under the constitutional amendment passed on 28th November, 1953, which provides that no person be elected to the office of President unless his nomination stipulates that he seeks election to that senior office. All persons nominated without such stipulation may be elected to any other office. This new method allows late variations in the nominations which were unduly rigid under the pre-existing rule.

Dr. Kenneth Adamson of Melbourne, the retiring Vice-President, was elected President. Dr. Gordon Rowell (former Hon. Treasurer) was elected Vice-President, Mr. N. E. Edney (former Hon. Secretary) Interstate Vice-President, Dr. John Wark (former Interstate Vice-President) Hon. Secretary and Dr. R. G. Williams, Hon. Treasurer. It is gratifying that four of the retiring officers who have rendered such outstanding service to the Association will continue to give their experienced guidance to the affairs of the A.D.A.

The Federal Office will be located in Melbourne and it is opportune to record that Mr. E. F. Hewlett has, in addition to his duties as State Branch Secretary, carried out the duties of Executive Secretary of the Federal Office with a high order of ability and marked administrative success.

Information from the Dental Board

The following matters are reported from meetings of the Dental Board of New South Wales held in August and September.

Proficiency Prizes.

An amount of £100 was approved as a grant from the Dental Board Education and Research Account to be used by the University for the purpose of providing proficiency prizes for 1st and 2nd Year students in the Faculty of Dentistry for 1953.

Applications for Registration.

Cross, Barry Laurence, B.D.S., Univ. Syd., 1950; Eslake, Alan Donald, B.D.S., Univ. Syd., 1951; Sinclair, F., B.D.Sc., Univ. Melb., 1954; Walters, Ian Paterson, B.D.S., Univ. Syd., 1952.

Additional Qualifications.

Permission to use the title M.D.S., University of Sydney, was granted to George Mumford. Barry Laurence Cross and Terence Joseph Wilson were permitted to use the additional description, D.D.S. (Northwestern).

Restorations.

The names of Bruce Bertram Burns and Susan Mary Hull were restored to the Register.

Locum Tenens.

It was noted that Mr. P. J. Hooten was employing Mr. J. F. Mitchell.

General Business.

Report of Deans of the Dental Schools of Australia.

The Board passed the following resolution, viz:—

That no certificate, diploma, membership, degree, licence, letters, testimonials or other title, status, document or description granted to a registered dentist by a University, College or Institution outside Australia which denotes or implies that the registered dentist is entitled to adopt or use in relation to his practice as a dentist, the title, status or description of "Doctor" or has qualified as a "Doctor" shall be authorised by the Board in pursuance of Section 6 (1) (e) of the Dentists Act, 1934-1946 to be entered in connection with his name in the register unless the Board is satisfied that such certificate, diploma, membership, degree, licence, letters, testimonial or other title, status, document or description is at least equal to the degree of Doctor of Dental Science in the University of Sydney.

The provisions of this resolution shall apply to and in respect of persons who commence courses of instruction at any University, College or Institution outside Australia after the first day of January, 1955.

News and Notes

Illness and Resignation of President

It is with regret that the Executive of the Australian Dental Association, New South Wales Branch, advises members that Dr. F. E. Helmore suffered a severe illness necessitating a surgical operation during the third week of September. Dr. Helmore is making a speedy recovery from this illness.

As Dr. Helmore was instructed by his medical advisors not to undertake onerous duties extraneous to his practice for some time, and having in mind the importance of immediate Association activities, he tendered his resignation from the office of President.

The Executive, fully understanding his position, accepted with regret his resignation as President at a meeting on 11th October, and proceeded in accordance with Article 26 of the Articles of Association to elect Dr. A. Gordon Rowell to the office of President.

Federation Dentaire Internationale 42nd Annual Meeting, Scheveningen, Netherlands

The Annual Meeting of the Federation Dentaire Internationale took place this year in Scheveningen, Netherlands, from June 8th to 13th, and was held in conjunction with the Jubilee Congress of the Dutch Dental Associations, which were celebrating respectively their 75th, 50th and 40th anniversaries. As might be expected, the meeting was an unusually large one and well over a thousand members attended, including no fewer than 500 Supporting Members of the F.D.I.

The programme was divided into:

1. Prevention of Dental Caries.
2. Prevention of Orthodontic Deviations.
3. Prevention of Periodontal Diseases.
4. Preventive Dentistry from the Sociological and Economic Angle.

The procedure was a little unusual in that there were two or three papers on each main subject followed by a panel discussion by a number of experts led by a Chairman, who discussed the papers which had been read earlier. At the final session a panel consisting of those who had read papers and the Chairman of the various panels on each subject, under the Chairmanship of Dr. C. F. L. Nord, discussed the subject of Preventive Dentistry from every aspect.

The international character of these discussions can be judged by the fact that authorities from the following countries took part:—Belgium, Denmark, France, Germany, Great Britain, Israel, Italy, Netherlands, New Zealand, Norway, Sweden, Switzerland, and the United States of America, and there is no doubt that the whole programme was an outstanding success and represented authoritative dental opinion from all over the world.

The following resolutions were submitted by the Commissions and passed by the General Assembly:

I. "The International Dental Federation holding its XLIInd Annual Meeting in the Hague, Netherlands, calls the attention of all agencies interested in health to the urgent need for increasing support of research into dental problems and diseases, with a view to developing more effective preventive measures which would lead to the improvement of dental and general health of all peoples." (Scientific Commission)

II. "That the Council should be asked to facilitate an examination and report on the position of Ancillary Dental Workers in any comprehensive Dental Health Service, particularly with regard to their effective utilisation and supervision by fully qualified dental personnel." (Public Dental Health Services Commission)

III. "The Commission draws the attention of the Council to the urgent necessity of alerting public opinion and the responsible authorities to the danger to public health of the pretension of dental technicians to undertake work within the oral cavity, their competence being limited to work in the dental laboratory." (Public Dental Health Services Commission)

IV. "In consideration of:

1. The professional training of dental personnel.
2. The health services rendered by dental personnel.
3. The supervision and command exercised by dentists in military assignments.
4. The position due to dentists in consideration of the above

it is recommended:

That the F.D.I. recommend to the National Dental Societies and the Chiefs of the Military Services of those countries in which all dentists do not enjoy Officer status in the military service, to exert every possible effort to grant Officer status to all dentists in the military service." (Armed Forces Dental Services Commission)

V. The following resolution was approved for submission to the Supreme Commander Allied Powers in Europe:

"The Commission requests that Permanent Military Dental Representatives be assigned to Supreme Headquarters Allied Powers Europe on a permanent basis and to such other sub-headquarters of S.H.A.P.E. as may in the future be established where a Staff for Health Services is set up." (Armed Forces Dental Services Commission)

Obituary
Percy Chater Charlton

Members of the Profession of Dentistry will learn with deep regret of the death of Dr. Percy Chater Charlton on 30th September, 1954, at the age of 88 years.

The late Dr. Charlton—"P.C." as he was called—was endowed with the attributes of scholarship, dignity and sportsmanship, which established his status as a distinguished teacher and member of the dental profession. After graduating at Harvard University in the United States of America, he obtained further qualifications at the Royal College of Surgeons, England and Glasgow.

It was not long after graduation that Dr. Charlton showed his active interest in teaching, although busy with his private practice. On retirement from private practice, he accepted the appointment of superintendent of the Dental Hospital in 1914. He was then responsible for the extensive practical training the students obtained during the period 1914-1924.

Tall, and most dignified in stature, possessed with a cheerful and kindly disposition, Charlton was always to be found instilling confidence and knowledge into the minds of his grateful students.

In the realm of sport he excelled in the fields of tennis, boxing, golf and cricket. He was a member of the Fifth Australian Eleven which visited England in 1890. Later he was a foundation member of the Pymble Golf Club and was President of that Club for several years.

Members of the profession including his former students express to his wife and family deepest sympathy at this sad hour.

"In all the varied experiences of human life, that man is happiest who has served best, and he has served best who has day by day added his mite to the material, the physical and the moral welfare of his fellowman."

In this category must be placed the life of Percy Charlton—I am, therefore, glad I was privileged to be one of his students.—A.J.A.

Blue Mountains Division Annual Sports Day

The seventh annual Sports Day of the Blue Mountains Division was held at the Leura Golf Club on 28th October, 1954. The bowls scheduled for play at the Katoomba Bowling Green was cancelled due to inclement weather, and the bowls prize winners were drawn. A number of golfers hit off and an enjoyable day was had by many members despite the weather conditions.

Results were as follows:

Golf.

Best scratch score: D. Ratcliffe, 72.
Winner Handicap: W. Murphy, net 59, hand. 21.
Runner-up, scratch: P. Hall, 85.
Runner-up, Hand.: J. Cordaiy, net 67.
First Nine: R. Moore, 41.
Second Nine: S. S. Jackson, 39.
Bradman Trophy: G. Barham, 124.

Bowls.

Winners: J. Wakley and D. McEwan.
Runners-up: H. Croxon and M. Buchanan.

Standard Specifications for Dental Materials

The attention of members is drawn to the fact that, from time to time, the Standards Association of Australia publishes in booklet form the Australian Standards Specifications for various dental materials. These specifications are endorsed by this Association.

Any members who are desirous of obtaining copies may do so by applying to the Standards Association of Australia at any of the following addresses:—

Sydney: Science House, Gloucester and Essex Streets.

Melbourne: Temple Court, 422 Collins Street.

Brisbane: School of Arts Building, 162 Ann Street.

Adelaide: Alliance Building, Grenfell Street.

Perth: Gledden Building, Hay Street.

Hobart: C/o Engineering Library, Technical College.

Canberra: Department of Works and Housing, Acton Offices.

Newcastle: Box 37A, P.O.

Association Activities

Australian Dental Association (New South Wales Branch)

General Meetings.

At the Ordinary General Meeting of the Association on 28th September, 1954, addresses on various Association affairs were given by Dr. J. V. Hall Best, Federal President, Dr. A. G. Rowell and Dr. A. G. H. Lawes. Dr. Hall Best spoke on Federal Office activities and Dr. Rowell and Dr. Lawes dealt with certain activities of the New South Wales State Branch.

The Ordinary General Meeting set down for October was deferred by the Executive and held immediately prior to an Extraordinary General Meeting on 1st November. On this occasion the meeting was briefly addressed by the President, Dr. Rowell, on matters pertaining to proposed amendments to dental legislation in this State.

Extraordinary General Meetings.

An Extraordinary General Meeting of the Association was held on the requisition of 25 members on Monday, 18th October, 1954, to consider a motion of no-confidence in the Executive of the Association. The motion was defeated by a big majority.

A further Extraordinary General Meeting was called by the Executive for Monday, 1st November, consequent upon a request of the Ordinary General Meeting of 28th September, 1954. The meeting considered a motion requesting the Executive to arrange a referendum among members of the Association concerning the use of the description of "doctor" for the dental profession. The motion before the meeting was resolved in the negative.

Annual General Meeting.

The Annual General Meeting will be held on 23rd November, 1954. A lengthy Annual Report containing Balance Sheets and Supporting Accounts has been circulated to all members and their attention is directed to this resume of Association activities for the past year.

Executive Report.

Legislative Matters—Fact Finding Committee, Dental Technicians.

Subsequent to the presentation by the Chairman of the Fact Finding Committee of his report to the Minister for Health, this Association understood that a deputation from the Dental Technicians' Association and other non-dental bodies had waited upon the Minister. Accordingly, the Association requested the Minister to receive its representatives in order to place before him certain facts which the Association regarded as being in the public interest and which immediately arose out of submissions placed by this Association before the Fact Finding Committee. The Minister at that time replied to our request promising to receive such representatives before a decision was made.

The Minister later invited a deputation from this Association to wait upon him on 5th October, 1954, when he placed before them certain suggestions concerning amendments to existing dental legislation.

The suggestions envisaged, among other matters, the establishment of short courses of training at the United Dental Hospital of Sydney for certain dental technicians, leading to examinations by the Dental Board of New South Wales and registration as dentists.

The suggestions were considered in full by the Executive and a deputation again waited on the Minister on 19th October, 1954. This deputation expressed the Association's intense opposition to any legislation which would lower the standard of dentistry in this State and interfere with the quality of dental services available to the public.

Second Country Convention, Orange.

The Second Country Convention of the Association held in Orange during September was an outstanding success. All members attending spoke enthusiastically of the organisation and the facilities made available by the Convention Commission which was drawn from members of the Western Division of the Association.

The comprehensive programme of lectures, table and silent clinics and films was well attended by members of the Convention. Dr. Edwin Johnson of Melbourne was the Interstate guest lecturer at the Convention.

During the week the many social, tourist and sporting facilities offering in the City of Orange were made available and fully used by members of the Convention and their wives.

The Executive wishes to express its thanks and appreciation and to convey its congratulations to the organisers of the Convention, to the lecturers and clinicians, the Council of the City of Orange and to all other persons who contributed to the success of the Convention.

Good Teeth Competition.

A most successful activity of the Dental Health Education Department this year was the Good Teeth Competition which culminated in the presentation of prizes at the opening of the Health Week Exhibition. The competition was conducted by the Association in co-operation with the Youth Welfare Association of Australia.

The Lord Mayor of Sydney, Ald. Hills, presented the prizes to the six successful entrants.

This competition proved of great public interest and lead to a stimulus of interest among parents and children in the advantages of good dental health. It is hoped that the competition will be conducted again and enlarged next year.

Walter and Eliza Hall Trust and Australian Dental Association, New South Wales Branch, Research Scholarship.

Discussions have taken place over recent months with the Walter and Eliza Hall Trust concerning the revival of this Scholarship after a lapse of two years. The regulations governing the scholarship and the salary payable have been reviewed by the Trust and this Association. The amended regulations have been forwarded to the Senate of the University of Sydney, and it is hoped to revive this scholarship in 1955.

MEMBERSHIP.

New Members.

Bailey, R., B.D.S.; Cocks, R. B., B.D.S.; Cross, B. L., B.D.S.; Duckworth, J. A., B.D.S.; Duncan, R. E., B.D.S.; Green, L., B.D.S.; Hill, N. A., B.D.S.; Ingall, W. B., B.D.S.; Symes, W. J., B.D.S.; Walters, I. P., B.D.S.

Leave of absence.

MacKenzie, L.

Resumption of full membership.

Knott, B. M.; McDonald, S. B.

Deceased.

Bateman, E. P.; Henderson, A. S.; Larkin, J. T.; Rainson, A. S.; Sainsbury, E. J.; Tompson, R.; Wall, C. H.

Dental Materials

Current Notes No. 28*

Copper amalgam, according to some practitioners, has little or no place in dentistry yet its use, particularly in children's dentistry, is strongly supported by others. Both sides appeal to various biological properties of the material in support of their arguments leaving a certain amount of confusion in the mind of the general practitioner who is not in a position to experiment.

It is pleasing to record an attempt in this country to make the position clearer. Mr. J. F. Lavis, M.D.S., of Adelaide has been investigating the problem systematically and, from a study of the literature and the results so far of his own experiments, he reached, *inter alia*, the following conclusions:

Copper amalgam contracts on setting and this contraction is accentuated by overheating. It is suggested that increased contraction may be associated with increased copper content resulting from the ability to express more mercury after the pellets have been heated to higher temperatures. Lavis also confirmed a marked increase in setting time when the heating temperature is raised. These two effects point to the desirability of heating the amalgam with as little severity as possible. For minimum shrinkage and minimum setting time, the amalgam should be heated just until beads of mercury appear, then triturated as usual. Ideally a controlled temperature device such as a solder bath should be used.

The heating temperature appears to have little effect on the eventual hardness and strength, which compare favourably with the values obtained with silver amalgams. There is no laboratory support for the claim sometimes made that copper amalgam adheres more strongly to tooth structures.

One disability of copper amalgam is the relatively high solubility in oral fluids often resulting in the "cupping-out" of restorations.

The leaching of the copper and mercury corrosion products is responsible for the marked bactericidal properties of the material. It also accounts for the readiness with which the margins are blocked so preventing the percolation of fluids observed when freshly restored teeth are placed in iced water and subsequently wiped dry and warmed. It is probable that, in the mouth, oxides and sulphides of copper are formed which, with other debris, effectively prevent marginal seepage through thermal changes. The breakdown products appear to have no deleterious action on the soft tissues.

Some time ago the Standards Association of Australia, Dental Materials Committee had proposed to draw up an Australian Standard for copper amalgam. The impossibility of obtaining reproducible results using conventional methods of preparation was one of the factors that led to the abandonment of the project. Anyone tackling the problem soon realises how difficult it is to control the variables and obtain consistent results and those who attempt investigations on copper amalgam deserve every encouragement.

*Contribution from the Commonwealth Bureau of Dental Standards with acknowledgments to Mr. J. F. Lavis.

New Books and Publications

BACTERIOLOGY FOR STUDENTS OF DENTAL SURGERY, by R. B. Lucas and I. R. H. Kramer, London, 1954, J. & A. Churchill Ltd. *Our copy by courtesy of the publishers.*

This book attempts to present within convenient dimensions such elementary knowledge of microbiology as students of dentistry should possess.

The book is well printed and bound and the type easy to read. On the whole the figures illustrating the text are satisfactory, but there seems little value in parts 4, 5 and 6 of the coloured frontispiece.

The coverage indicated by the chapter headings is adequate, as is also the space devoted to these headings, although opinion here will vary. The reviewer would like to see a longer discussion of the bacteriology of caries and the bacteriological examination of oral lesions.

Exception must be taken to a number of minor infelicities of expression and terminology, which however do not seriously prejudice the value of the book.

Criticisms are more than countered by the many good points of the work. The writing is on the whole clear and gratifyingly free of verbosity. The treatment of the topics reveals a thorough grasp of essentials and principles. Dogmatism is subordinated to restraint wherever the facts or lack of them dictate such restraint.

All in all, this is one of the most satisfying books of its kind and although it needs a number of emendations, it were unfair to emphasise minor blemishes in the presence of so many good points.

The book can be confidently recommended to students and indeed practitioners of dentistry. —N.E.G.

THE PHYSIOLOGY OF THE MOUTH, by G. Neil Jenkins, Oxford, 1954, Blackwell Scientific Publications. (288 pp.). *Our copy by courtesy of the publishers.*

The title of this book is misleading as the author devotes fully half of the book to biochemistry. However, the integration of the physiology and biochemistry of oral structures is perhaps one of the most satisfying aspects of this book and should make it one of value to students of dentistry, both undergraduate and graduate. It is a further step in supplying suitable text books on the biological basis of dental practice—a field singularly poorly supplied.

The author places the major stress on tooth formation, structure and factors which influence them, devoting two-thirds of the book to these subjects. Chapters on saliva, dental caries, mastication and swallowing, sensations arising in the mouth, and speech make up the remainder of the book.

A large amount of data, normally only available in original articles, has been collected together and some attempt made to evaluate it. The author is an English physiologist but in general the views expressed are those held by the majority of American dental research workers. In the section on dental caries more stress than usual is placed on tooth resistance than on the processes of caries attack. Gingival and periodontal tissues receive only very brief mention.

References are limited to review articles and a few articles of outstanding interest, probably because the book was written primarily for undergraduates. Unfortunately many statements cannot be traced from the references. A more extensive bibliography would have added greatly to the value of the book.—M.R.D.

PARTIAL DENTURES, by J. Osborne and G. L. Lammie, Oxford, 1954, Blackwell Scientific Publications. (374 pp. 202 ill.). *Our copy by courtesy of the publishers.*

This book, by two well known British authors, is an attempt to fill an obvious gap in dental literature. It deals with the basic problems and considerations associated with the construction of partial dentures. The text stresses the biological and physiological aspects.

Diagnosis, prognosis and treatment planning are adequately treated in the various sections of the book.

Surveying and principles of partial denture design are considered in detail, and the application of these principles to actual cases shown. It is a pity that a few of the illustrations show cases in which the attention to detail could have been greater.

Although the authors are concerned primarily with cast dentures, due regard is given to other denture base materials and the problems and modifications attached to their use.

A notable omission is found in the section dealing with impression methods and materials—agar hydrocolloid impression materials and techniques are completely omitted, and in fact receive the barest mention in the whole text of the book.

For the most part the book deals with accepted techniques in all the phases of partial

denture construction and does not deal at any great length with advanced techniques. Consequently, the book should be very valuable to both the student and general practitioner.

The book is strongly bound and is printed in excellent type on a good grade of paper. Diagrams and illustrations are to be found in great numbers throughout the text.—B.A.

MEDICINE IN OXFORD, by Maurice Davidson, London, 1953, Macmillan & Co. *Our copy by courtesy of the publishers.*

This small volume contains the Fitzpatrick Lectures for 1952-53 which were delivered before the Royal College of Physicians of London. It consists of four lectures in which Dr. Davidson traces the history of Medicine in Oxford from the origin of the University during the Twelfth Century until 1914 A.D. The theme which flows throughout the lectures is the relationship between Medicine and Scholarship. The emergence of the scientific approach to Medicine during the later part of the Nineteenth Century and the struggle to build the University Museum are best viewed against the development of Medicine in Oxford during the preceding centuries.

The influence of Hippocrates, Aretaeus, Galen, Celsus and Vesalius of the Padua School is clearly traced. Dr. Davidson speaks of many of the important "milestones" in the development of Medicine in Oxford without loss of perspective. He draws back the curtain of centuries and takes us into the Oxford of the Middle Ages of which the leading men and the atmosphere are both so well portrayed.

As the scientific approach in the preceding hundred years has produced a mass of facts and technical details for the student of Medicine to learn, so his scholastic grounding in the classics has been gradually reduced. In this present age too few of the numerous medical graduates are equipped to handle the difficult problems which confront Medicine and the bridge between Medicine and the Humanities becomes more difficult to construct. The lecturer suggests that "In the re-building of our bridge some of the corner stones have already been laid . . . The materials for its completion lie ready to our tardy hands; the ornaments with which its parapets must be adorned are around us in abundance for those of us who have eyes to see them. In this utilitarian age, with all its worship of the earthy and its apotheosis of the ephemeral, where better could we seek them than in the historic background, in the ancient spirit and atmosphere, and in all the nobility and grace and beauty of that great Academy of learning, whose motto for four hundred years has been DOMINUS ILLUMINATIO MEA."—B.L.

Abstracts of Current Literature

A short note on certain selected articles appearing in current overseas journals.

The Journal of the American Dental Association, Vol. 48, No. 3, March, 1954.

An anatomic and physiological approach to treatment of temporomandibular joint disturbances: Schreiber, H. R.

At the present time roentgenographic or laminagraphic technics are not successful for diagnosis of temporomandibular joint difficulties resulting from malocclusion. A more rational approach to diagnosis and treatment lies in the use of the physiologic rest position and path of closure of the mandible.

Common problems in the construction of the full cast crown: Hoffman, Jules M.

The indirect compound impression procedure can be a clinically accurate method for the construction of a full cast crown. Badly decayed teeth can be restored by the use of full crowns without restoring to pulp devitalization. Intracoronal retention can be used for restoration of the tooth with amalgam before the preparation of the crown is made or for direct retention of the crown. Gingival recession can be minimized by the division of the preparation into two phases. A crown form is used to retract the gingiva so that on the second visit the preparation can be carried below the gingiva with a minimum of trauma to the soft tissues.

Difficulties in impression making can be elimininated by the use of an annealed, snug-fitting and accurately festooned band. An increase in pressure will not produce a sharper impression, since a fluid cannot be compressed. Excessive pressure results in distortion of the compound.

Reproduction of the buccal height of contour is important in order to protect the soft tissues from the impact of food. Covering the inner occlusal surface of the crown with cement may result in a faulty seat during cementation because of the tremendous hydraulic pressure developed.

The effects of drugs in the treatment of necrotizing ulcerative gingivitis: Schaffer, E. M.

In this study of necrotizing ulcerative gingivitis, 56 patients were treated alternately. Of 33 patients treated with penicillin troches (1,000 units, one every two hours), 31 were cured, but 2 patients with gingival flaps over partially erupted third molars failed to respond to the treatment. In the control group that received placebo troches and no drugs, 22 of the 23 patients were cured by curettage,

prophylaxis and home care. The one failure to effect a cure resulted from a complete lack of co-operation in interdental brushing and massage.

In the pilot study, penicillin relieved the symptoms more effectively than neoarsphenamine, oxopherarsine hydrochloride or hydrogen peroxide.

Penicillin is an aid to treatment because it relieves the symptoms readily and shortens the period of treatment; however, the disease can be cured without drugs by thorough curettage, prophylaxis and conscientious home care. Drugs are, at best, only an adjunct to treatment.

Comparative bactericidal effects of various temperatures of hot oils: Knighton, H. T.

A study of the bactericidal effects of various temperatures of hot oils showed the time required to kill spores of stock cultures decreased from two to threefold for each 10° C. rise in temperature between 130° to 160° C. The time required for a bactericidal effect on partially dry nonspore-forming bacteria decreased approximately twofold for each 10° C. rise from 120° to 140° C. It required 160° C. hot oil to surpass 100° C. water in rapidity of sporicidal effectiveness. It was necessary to heat oil at 150° C. to kill certain relatively dry nonspore-forming bacteria within one minute. There was little or no difference in the bactericidal effectiveness of the relatively nonodorous oils tests.

Journal of Dental Research
Vol. 33, No. 2, April, 1954.

Use of the germ-free animal technic in the study of experimental dental caries: Orland, F. J. *et al.*

Methods and technics for adopting the procedures of germ-free rearing of animals to study experimental dental caries are described in this first and complete report on the initial phase of this most interesting study. The rats are delivered by caesarean section under aseptic conditions and they are then maintained throughout life in a completely germ-free atmosphere and fed on sterile food. Thus they are maintained completely free of organisms both on their bodies and in their intestinal tracts.

Findings indicated that twenty-two rats reared under germ-free conditions remained entirely free of even microscopically demonstrable dental caries. Of thirty-nine conventional control rats, possessing the usual mixed microbial populations, thirty-eight developed carious lesions when maintained on the same kind of dietary regime as the germ-free animals.

It is deduced from this evidence that dental caries in the rat is not possible in the absence of micro-organisms.

The influence of injury to the periodontal membrane on the spread of gingival inflammation: Macapanpan, L. C. and Weinmann, J. P.

The progress of gingivitis of local origin into the periodontal membrane damaged during tooth movement was studied by the insertion of rubber dam between the upper molars of rats. This also acted as a foreign body and caused interdental gingivitis. Trauma caused damage to the periodontal membrane on both pressure and tension sides. Damage to the periodontal membrane on the tension side diminished the resistance of the normal periodontal membrane to direct infiltration from a gingival inflammation leading to periodontitis.

The findings in this experiment support the view that traumatism of the periodontal membrane will not, by itself, cause periodontitis.

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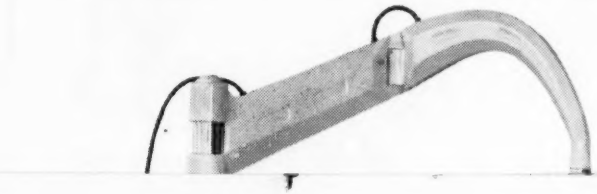

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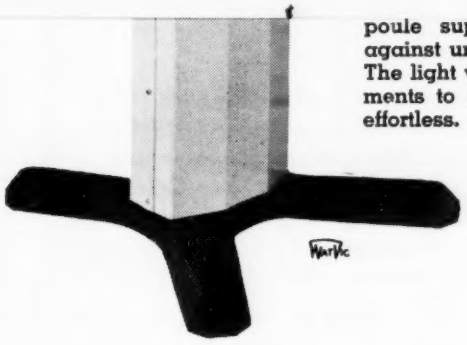

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Say you saw it in "The Dental Journal of Australia"

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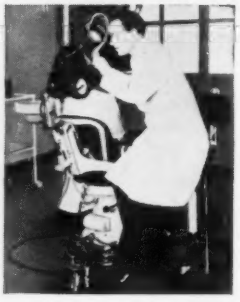

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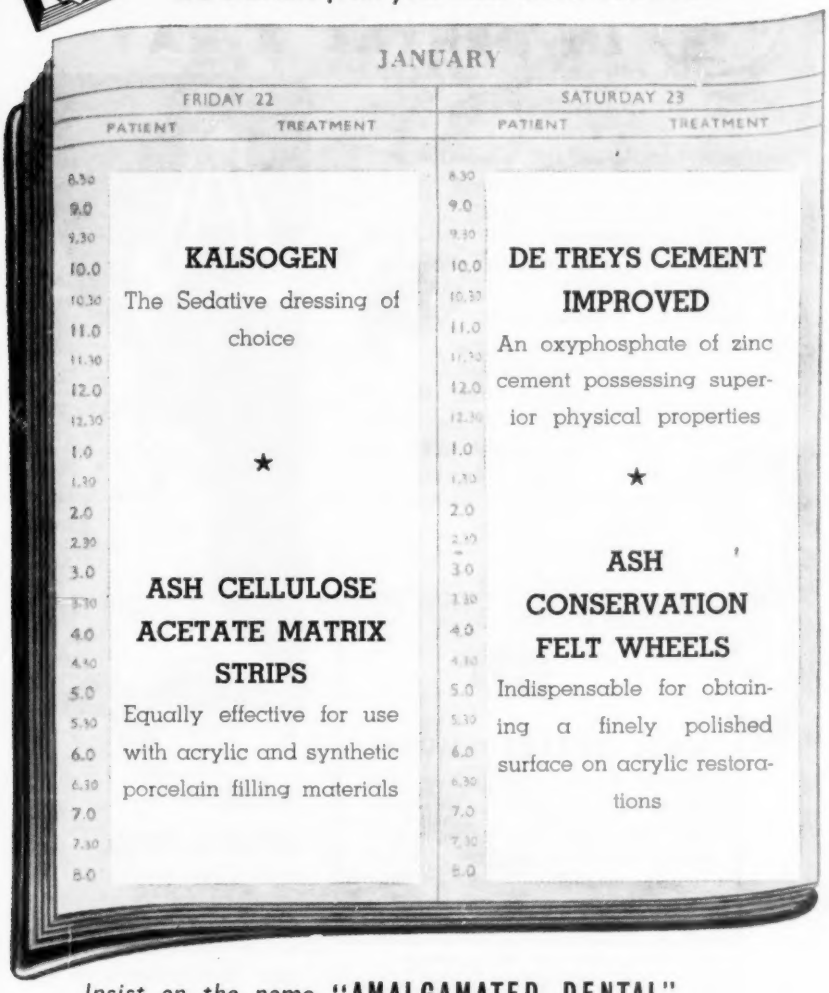

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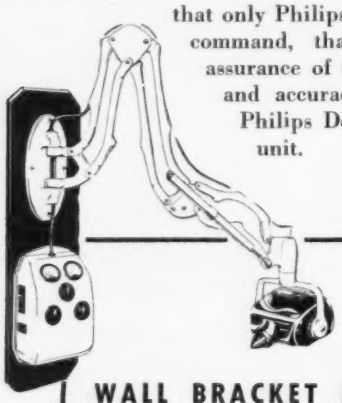

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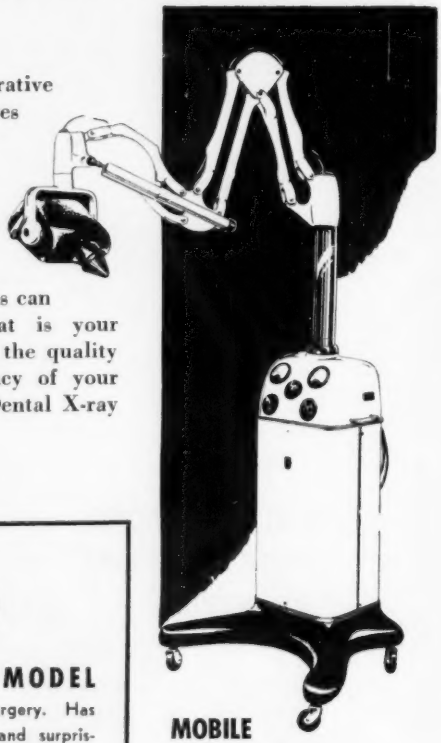

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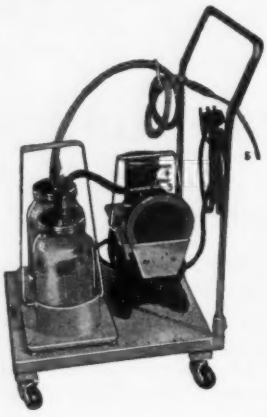

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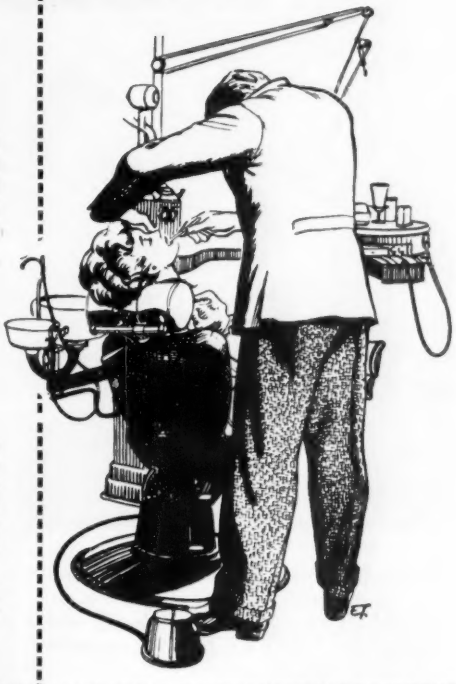

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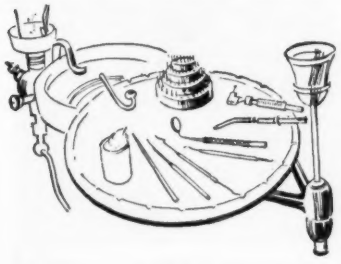

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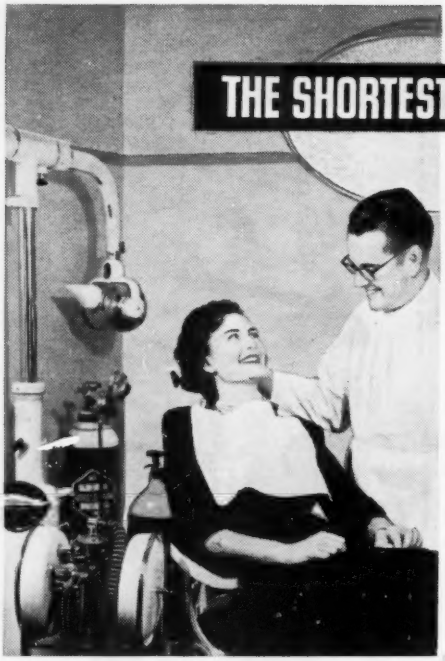

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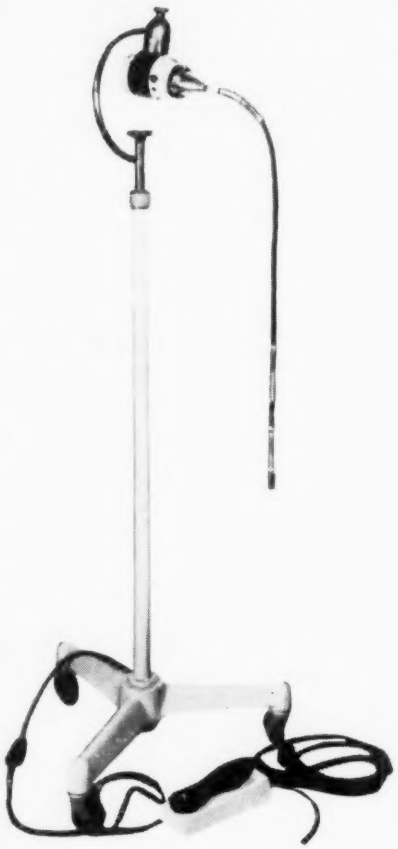

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